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SEATTLE, WASHINGTON

THE BOEING COMPANY

CODE IDENT NO. 81205

NUMBER D2-14827

TITLE TECHNICAL FACILITY CRITERIA FOR THE MINUTEMAN LAUNCH CONTROL FACILITIES, FRANCIS E. WARREN AFB, WYOMING (U)

MODEL NO. WS-133A CONTRACT NO. AF04(694)-107

ISSUE NO. 30 ISSUED TO GSTIA

Specification S-133-30-25

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VOL. NO. OF
SECT. PAGE 1 OF 46

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ACTIVE PAGE RECORD

SECTION	ORIG REL PAGE NO.	REV SYM	ADDED PAGES						SECTION	ORIG REL PAGE NO.	REV SYM	ADDED PAGES					
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REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED

FOREWORD

The original requirements for the WS-133A Launch Control Facilities were initially presented in STL document GM 60-A001-04703 (S-133-30-20). The STL document covered facilities design criteria as well as the form, fit, and function requirements of the Associated Contractors' equipment for Minuteman Wing I at Malmstrom AFB, Montana.

State of the art progress had dictated numerous changes and improvements to the original Launch Control Facility requirements. A large number of these variations were incorporated into Wing I by a revised and updated GM 60-A001-04703 (S-133-30-20) issued as Boeing document D2-14325. Variations peculiar to Minuteman Wing II at Ellsworth AFB, South Dakota, were included in Boeing document D2-10693 which was issued as a supplement to the Wing I criteria document and was limited to changes and additions therete.

Subsequent revisions to the Launch Control Facility requirements and improvements to the Weapon System, dictated the need for an original documentation of the facilities criteria for Wing III, North Dakota, in Boeing Document D2-13798. The first revision to Boeing Document D2-13798 incorporated criteria variations peculiar to Wing IV facilities at Whiteman AFB, Missouri.

Normal sequence of events would have placed the facilities design criteria in the hands of the Air Force agency awarding the facility contracts prior to the start of facilities design. Because of the Minuteman program concept of design and construction concurrency and also due to compressed schedules, this action did not occur for Wings III, IV, and V. Nevertheless, the necessity for this document as a base line for control of the form, fit, and function of the Associate Contractors' equipment, is most significiant if existing facilities are to be used to the maximum extent practical.

Wing IV criteria has been modified and updated to indicate Wing V requirements as a result of the following actions:

1. Collation of facility requirements which were developed through MIL-D-9412c Functional Analysis of the Wing V Weapon System (S-133-11-0-5 and S-133-12-0-5);
2. Incorporation of basic design and equipment compatibility changes as designated by the Configuration Control Board;
3. Incorporation of MCL/FCR changes through 15 May 1963;
4. Incorporation of facility design improvements resulting from criteria and concept review meetings;
5. Review and analysis of existing plans and specifications and "Basis of Design" for Wing V.

This specification describes the facility requirements necessary to make the Weapon System operable within established goals, with due consideration given to the existing facilities and associated conditions.

The following table of contents and list of illustrations are changes, additions, and deletions to the technical criteria of referenced document D2-13798 (Revision A) and these changes supersede the identical paragraph, drawings, and tables, of the referenced Document.

TABLE OF CONTENTS

LIST OF ILLUSTRATIONS

1.0 SCOPE

The technical facility criteria document for the Minuteman Launch Control Facilities at Francis E. Warren AFB is issued as a supplement to the Wing IV Launch Control Facility Criteria presented in Boeing Document D2-13798 (Revision A).

The complete Wing V Launch Control Facility criteria consists of the following:

a. Document D2-13798 (Revision A) sections one (1) through ten (10) and twelve (12).

   Section eleven (11) of Document D2-13798 identifies Wing III peculiar criteria only, and is not applicable to Wing V.

b. Document D2-14827 identifies the revised or additional requirements to site adapt and upgrade the Minuteman Launch Control Facilities for Francis E. Warren AFB in accordance with the latest Weapon System improvements. These requirements are identified by paragraph and figure notations corresponding to those in Document D2-13798 (Revision A).

Technical Revisions to Document D2-13796 (Revision A)

The following changes, additions and deletions shall be made to the applicable sections of Document D2-13796 (Revision A) as required to upgrade and site adapt the fourth deployment criteria to the fifth deployment area criteria.

3.0 GENERAL CRITERIA

3.1 DESCRIPTION OF FACILITY

3.1.3 Physical Description

Delete the words "Minot Air Force Base (MTAFB)" and in lieu there of insert the words "Francis Warren Air Force Base (FWAFB)".

3.3 ENVIRONMENT

3.3.1 Geographical

Delete the paragraph in its entirety and in lieu thereof insert the following:

Wing V, the fifth Minuteman Operational Deployment Area, shall be sited in the vicinity of Francis Warren Air Force Base, (FWAFB) at Cheyenne, Wyoming.

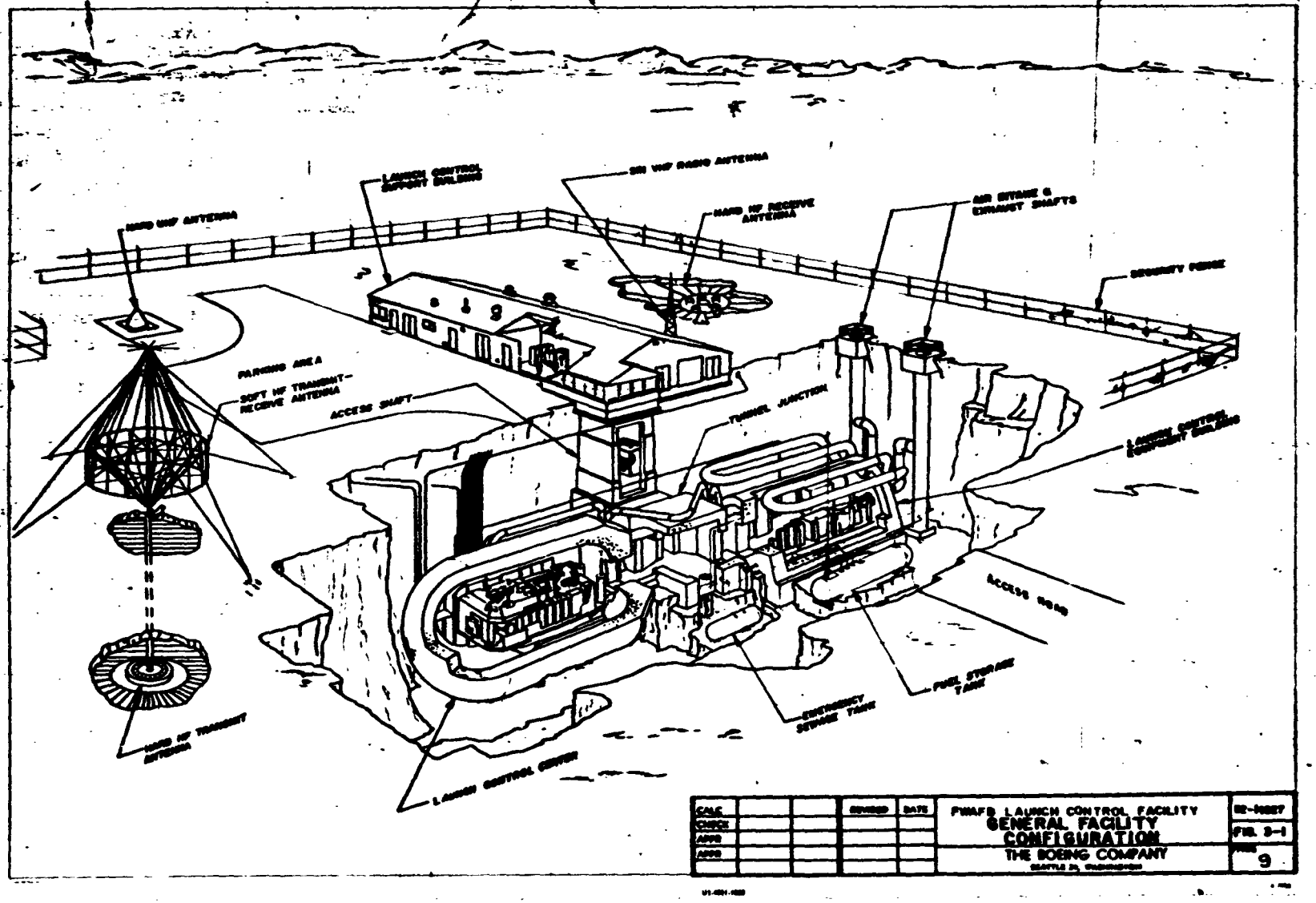
DRAWING REVISIONS

1. Figure 3-1 revised per conduit changes.

2. Table 3-1 Failure Rates

Delete the words "150 missile wing" and in lieu there of insert the words "200 missile wing".

Also delete the words "(Failure/month/15 LCF's)" and in lieu thereof insert the words "(Failure/month/20 LCF's)".



DRAWN			REVISED	DATE	PWAFB LAUNCH CONTROL FACILITY		82-10027
CHECK					GENERAL FACILITY CONFIGURATION		FIG. 3-1
APPR					THE BOEING COMPANY		PAGE 9
APPR					SEATTLE 24, WASHINGTON		

5.0 INTEGRATED CRITERIA

5.3 ELECTRICAL SYSTEM

5.3.2.2 Delete the words "(see paragraph 5.3.2.10)".

5.3.2.7 Delete the words "(see paragraph 5.3.2.10)".

5.4 COMMUNICATIONS SYSTEMS

5.4.2 Radio Communication

Delete the sentence "e". in its entirety and in lieu there of insert the following:

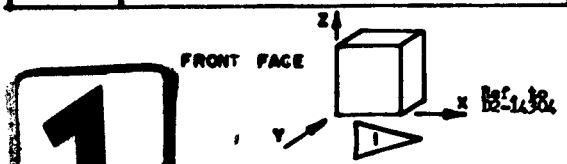
e. A soft HF Transmit-Receive antenna.

DRAWING REVISIONS

1. Figures 5-5, 5-6, 5-7, 5-8 and 5-8.1 revised per conduit changes.

2. Table 5-1 Equipment List LCF revised per LCEB equipment changes.

ITEM	NO.	EQUIPMENT	UNIT REQ'D	SIZE W x D x H	WT LBS	C.G. LOCATION X	Y	Z	POWER RE AC	DC	N AVG.
15	26	Engine Switching & Cranking Panel		42x14x							
16	27	Distribution Panel "LCDS"									
17	28	Drier Air Compressor Hardened Cable									
18	29	Circulating Fan		27x3?x							
19	30	Instrument Air Compressor									
20	31	Electrical Filter		24x20x							
21	32	Distribution Panel "LCIN"		38x19x							
22	33	Expansion Tank									
23	34	Vent System Control Panel									
24	35	Panel Installation Meter Air Flow									
25	36	CER Filter		40x34x							
26	37	Battery	2	36x11x							
27	38	Exhaust Blower									
28	39	LCES Alarm Panel									
29	40	Shock Isolators									
30	41	Engine Cranking Panel									
31	41a	SIM/TTE Rack									
32	41b	Air Bottles									
33	41c	Battery Charger									
	41d	Jack Box J-1308/GTC-8									
	41e	Sump Pump - Tunnel Junction									
	41f	Intake Blower Starter		18x8x8½							
	41g	Exhaust Blower Starter									
		LAUNCH CONTROL CENTER									
1	42	Console Launch Control OA-3384/GWS-4	1	60x30x49.1	611					28	145
	43	Communication Control Panel on LC Panel	1	31½x5?x 15¾	36					28	31
	44	Top Hat on Console Launch Control	1		125				120		0
2	45	Seat, Operators FM-127GWS-4	2	23x31x60	112						
2	46	Seat Operators FM-128GWS-4	1	23x31x60	112						
3	47	Power Supply Group, OA-3385/GWS-4	1	24x26x68	1080				4 3		6800
4	48	Digital Data Group, OA-3541(V)/GYK-1(V)	1	24x26x68	876					28	23
5	49	Command Message Processing Group	1	24x26x68	940					28	410
6	50	Status Message Processing Group	1	24x26x68	985					28	430
7	51	Console Communication Control (2nd Operator)	1	42x26x44	397					28	28*
	52	Communication Control Panel on Item 10	1	42x15½x14	112					28	28



2 POWER REQUIRED TO OPERATE ONLY 5 Ene
3 120/208 400 CPS 3
4 120/208 60 CPS 3

g. LOCATION			POWER REQUIREMENTS [2]						COOLING REQUIREMENTS			FIG. "A"	LOCATION	REMARKS
	Y [4]	Z [4]	AC	DC	NORMAL AVG.	NORMAL PEAK	EMERGENCY AVG.	EMERGENCY PEAK	TYPE COOLING	DISSIPATION NORMAL-W	DISSIPATION EMERGENCY-W			
												1207	GEKIA Installed	
												1264	GEKIB Installed	
				28	145	266	145	266		145*	145*	1243		5
				28	31	31	31	31		31	31	1243		5
			120		0	29	0	29		0	0	1368		5
												1334		5
												1335		5
			[4] 3		6800	7400	1820	2400	Forced	1430*	1000*	1289		5
				28	23	50	50	23	Forced	23*	23*	1265		5
				28	410	[6]	410	[6]	Forced	410*	410*	1213		5
				28	430	[6]	430	[6]	Forced	430*	430*	1213		5
				28	28*	56*	28	56		28*	28*	1338.3		5
				28	28	28	28	28		60*	60*	1338.3		5

) OPERATE ONLY 5 Essential for Launch

			REVISED	DATE	EQUIPMENT LIST LCF	22 MAY 27
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CHECK						
APPR						
APPR					THE BOEING COMPANY SEATTLE 24, WASHINGTON	PAGE 11

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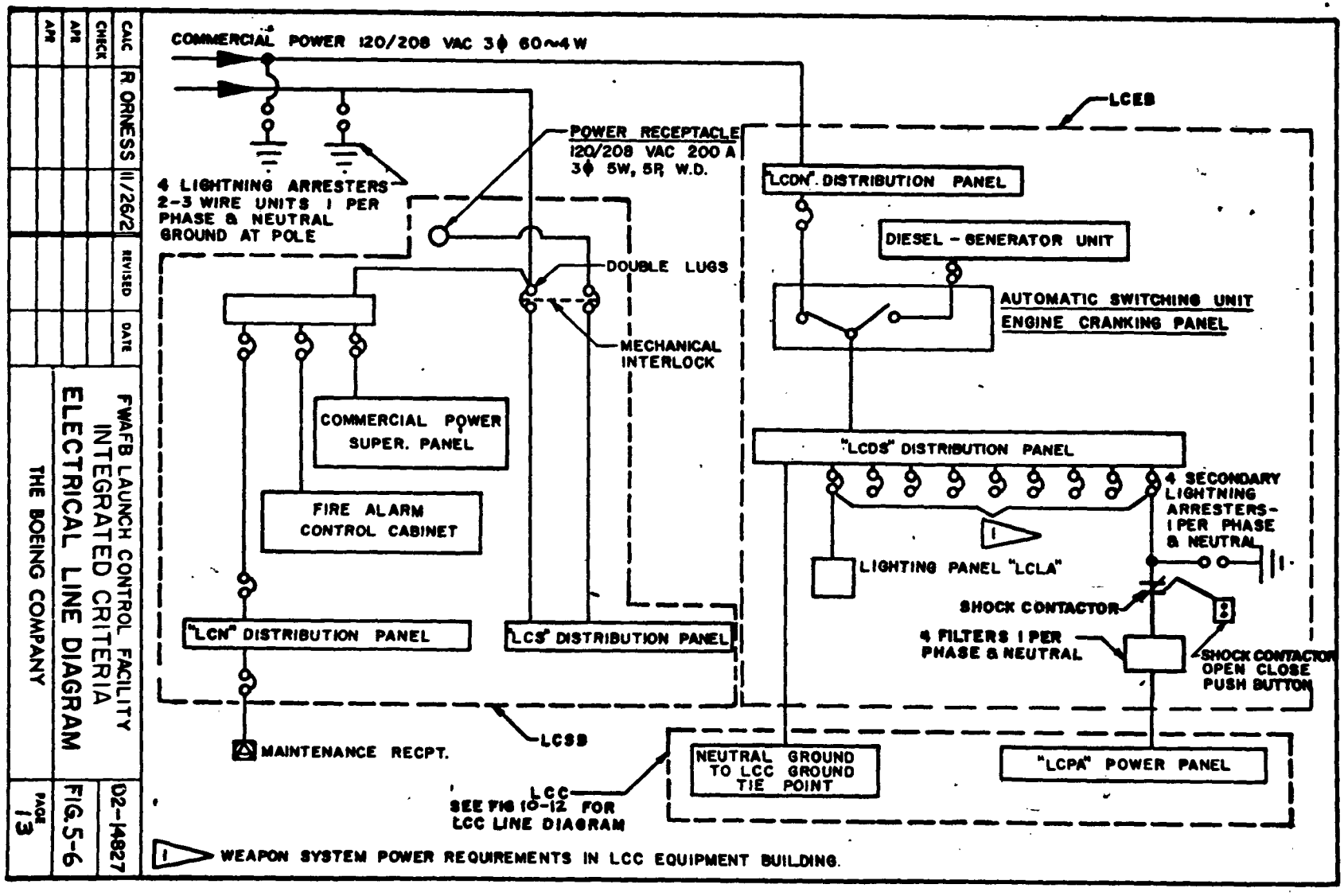

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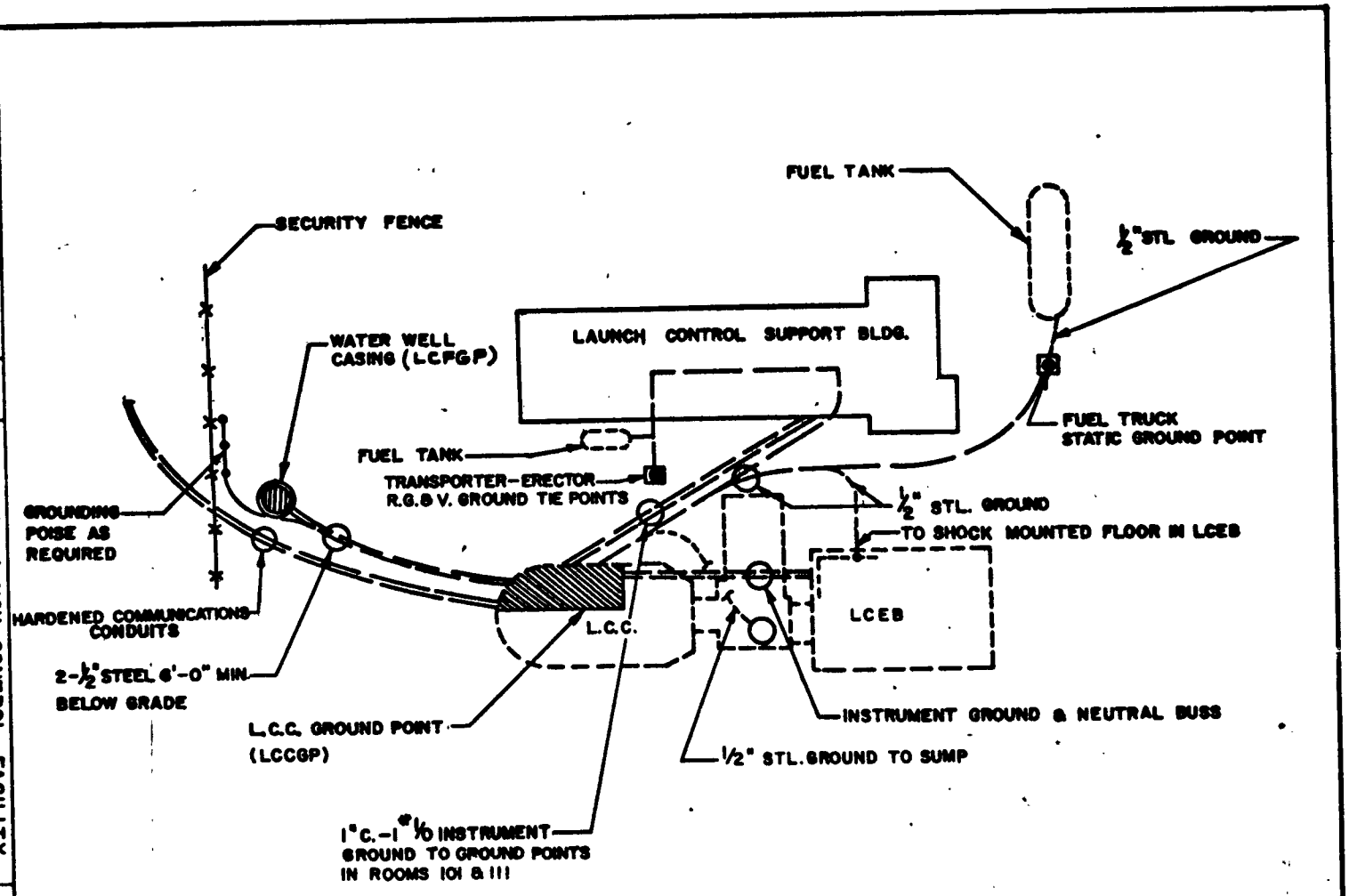
FWAFB LAUNCH CONTROL FACILITY
INTEGRATED CRITERIA
ELECTRICAL LINE DIAGRAM
THE BOEING COMPANY

02-14827 | FIG. 5-6 | PAGE 13



GROUNDING SYSTEM SCHEMATIC

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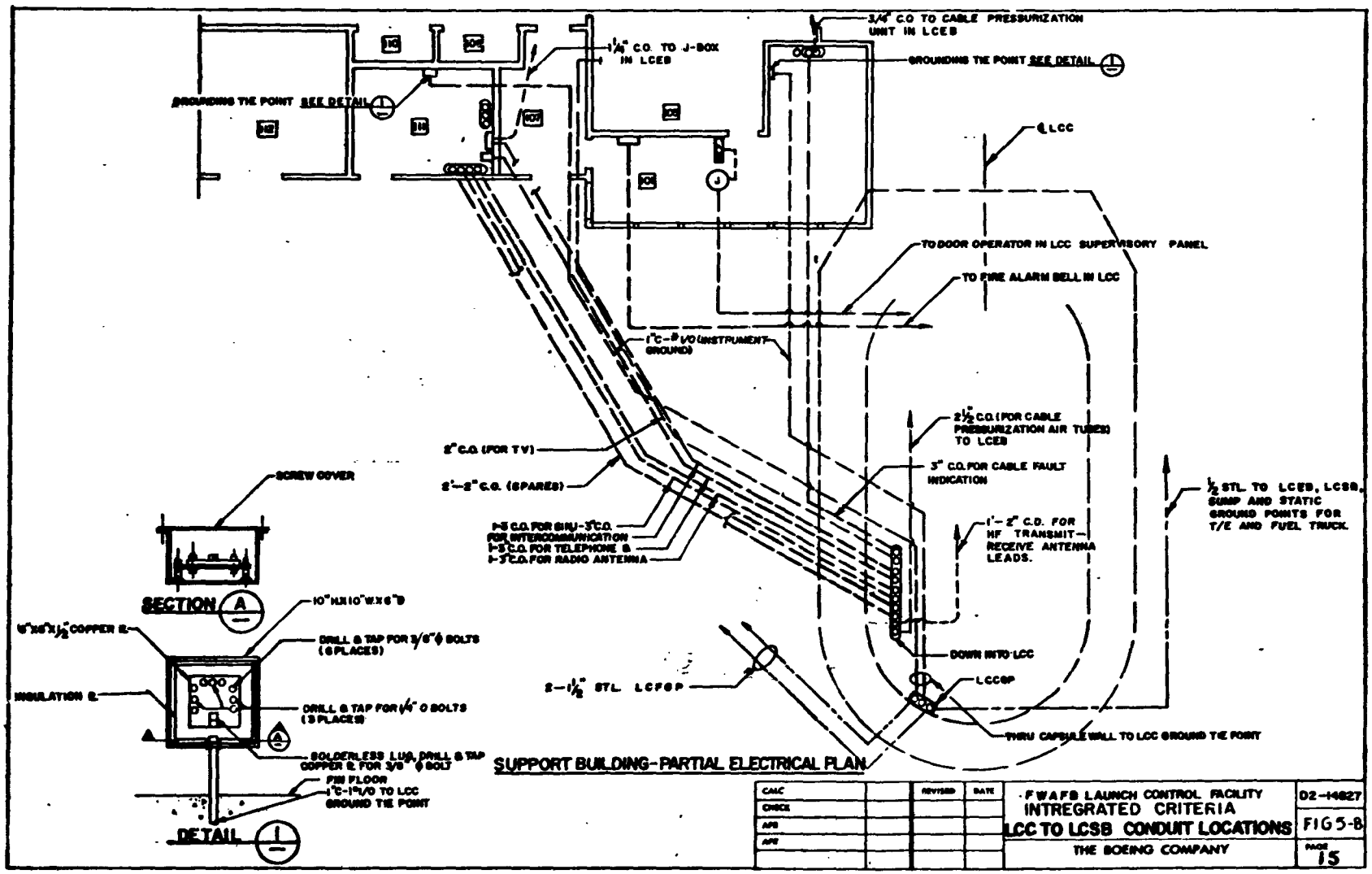
						REVISED	
						DATE	

FW AFB LAUNCH CONTROL FACILITY
INTEGRATED CRITERIA
GROUNDING SYSTEM SCHEMATIC

THE BOEING COMPANY

D2-14827 | FIG. 5-7 | PAGE 14



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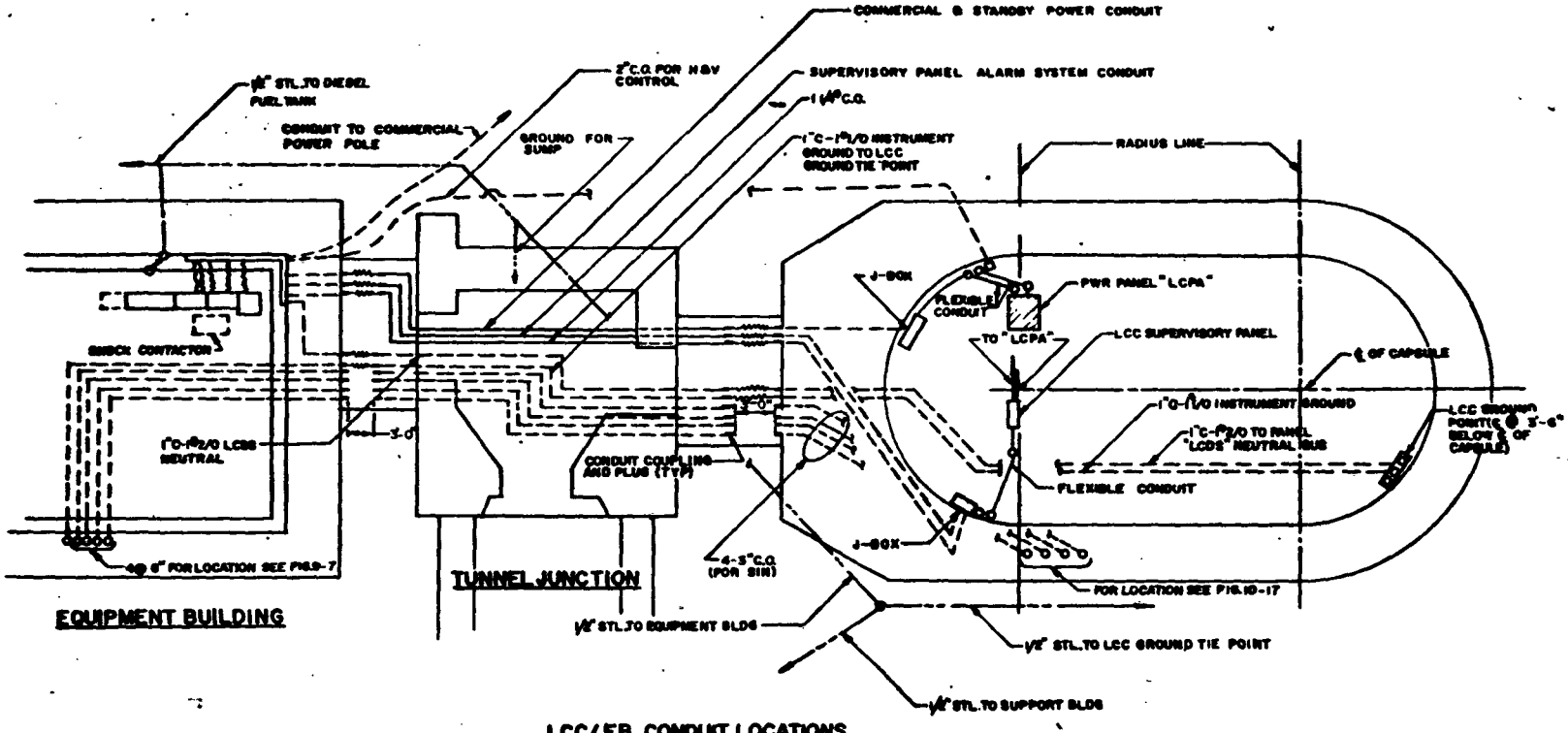
CHECK				INTEGRATED CRITERIA	
APP				LCC TO LCSB CONDUIT LOCATIONS	FIG 5-8
APP				THE BOEING COMPANY	PAGE 15



LCC/EB CONDUIT LOCATIONS

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CHECK				INTREGRATED CRITERIA
APP				LCC TO LCEB CONDUIT LOCATIONS
APP				THE BOEING COMPANY

D2-14827
FIG 5-8.1
PAGE 16

6.0 SOFT LAUNCH CONTROL SUPPORT FACILITY CRITERIA

6.1 FUNCTION

6.1.4.1 Security Control

Delete the paragraph in its entirety and in lieu thereof insert the following:

Capability shall be provided to maintain control over personnel entering the security-fenced compound and surveillance over entrance to the Soft Access Facility, the secured vehicle Parking Area, and the LCSB. Control to access shaft is by crew in LCC.

6.3 STRUCTURAL

6.3.1 Interfaces

Add to the list of interfaces the following:

Figure A 2914 Electronic Rack

6.6. COMMUNICATIONS

6.6.1.1 Delete in "a." the words "One,2-inch conduit for HF Antenna Cable".

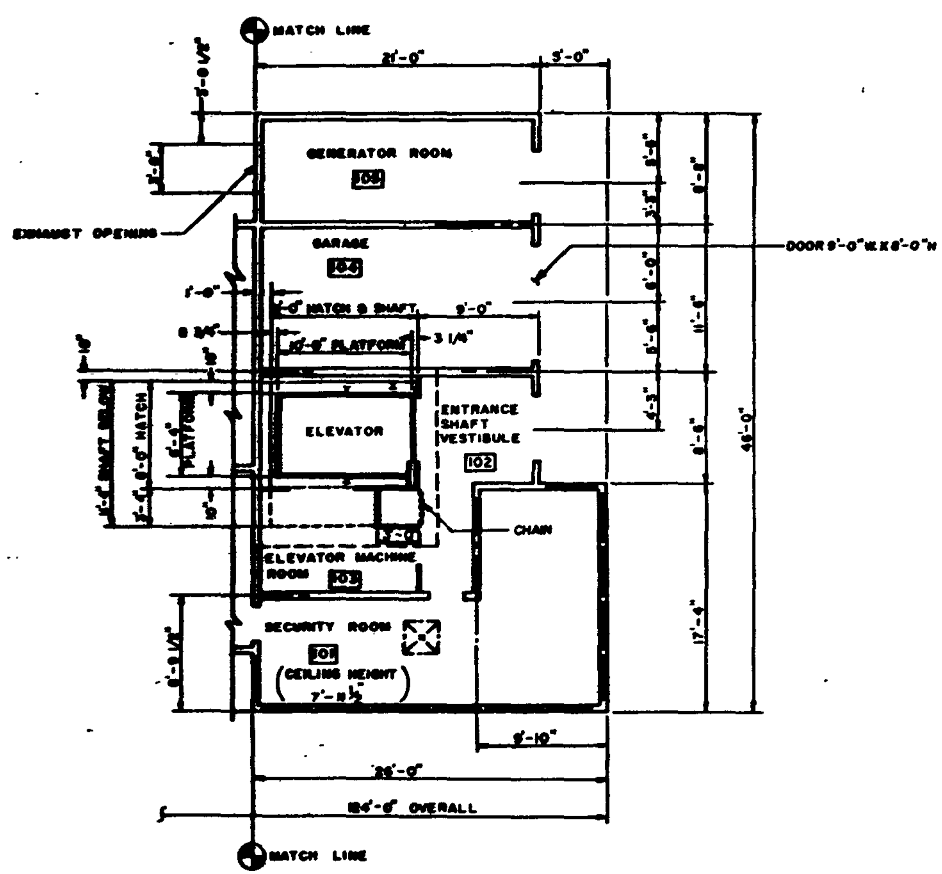
6.6.1.4 Delete the words "4-inch conduit" and in lieu thereof insert the words "3-inch conduit".

6.6.1.5 Delete the words "4-inch conduit" and in lieu thereof insert the words "2-inch conduit". Also delete the words "figure 6-4" and in lieu thereof insert the words "Figure 6-3".

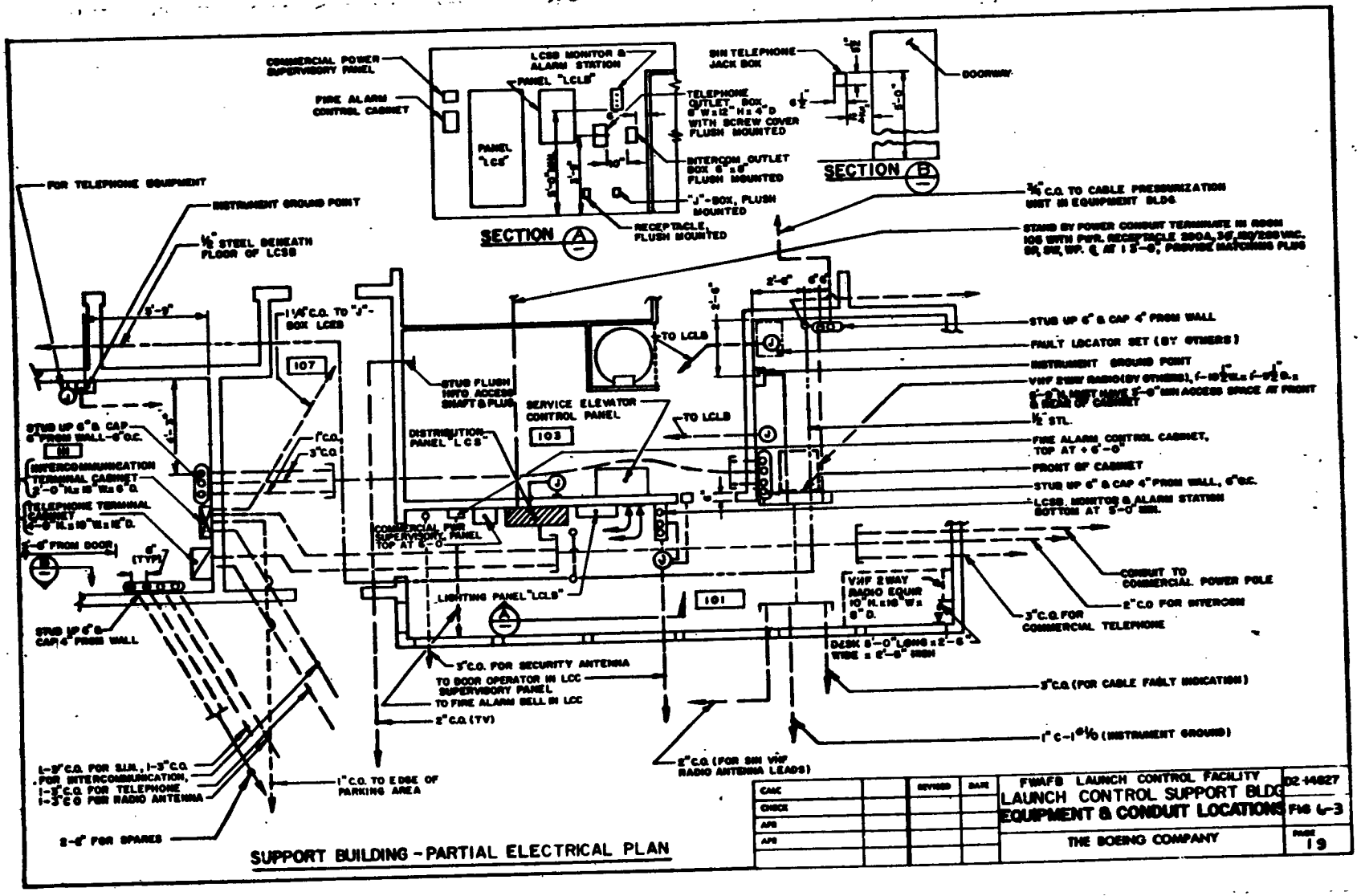
DRAWING REVISIONS

1. Figure 6-1.1 revised per dimension change.

2. Figure 6-3 revised per conduit changes.



CALC GARY L. JONES	11/17/65	REVISED	DATE	FWAFB LAUNCH CONTROL FACILITY LAUNCH CONTROL SUPPORT BLDG ARCHITECTURAL	D2-14827
CHECK					FIG. 6-1.1
APR				THE BOEING COMPANY	PAGE 18
APR					



SUPPORT BUILDING - PARTIAL ELECTRICAL PLAN

CAAC		REVISED	DATE	FWAFB LAUNCH CONTROL FACILITY — 02-14627
CHECK				LAUNCH CONTROL SUPPORT BLDG — FIG 6-3
APR				EQUIPMENT & CONDUIT LOCATIONS
APR				THE BOEING COMPANY — PAGE 19

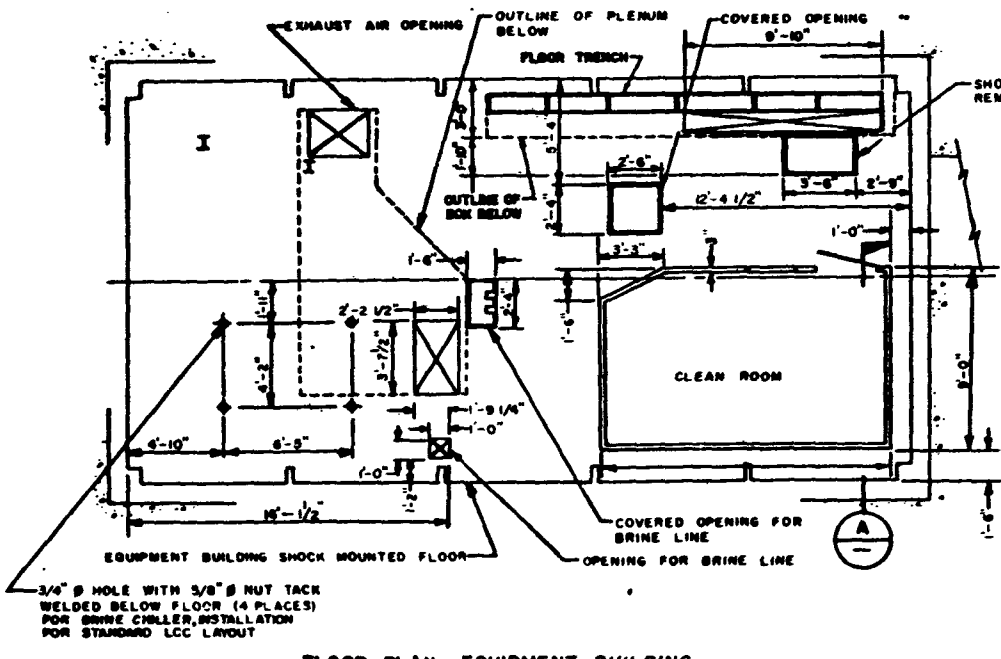
9.0 HARDENED TUNNEL JUNCTION AND LAUNCH CONTROL EQUIPMENT BUILDING CRITERIA

Space reservations for environmental control equipment, and equipment by others in all LCEB's, to be identical to that specified for Wing IV in D2-13798 (Revision A). Particularly note the requirements for the SIN/TTE rack, blast valve control panel, and blast valve installations.

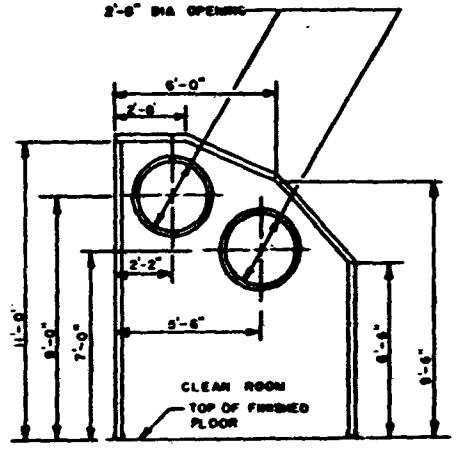
DRAWING REVISIONS

1. Figures 9-2, 9-3, 9-3.1, 9-3.2, 9-3.5, 9-3.6, 9-3.7, 9-4 and 9-7 revised per RPIE changes.

2. Figures 9-6 and 9-6.1 revised per blast valve changes.

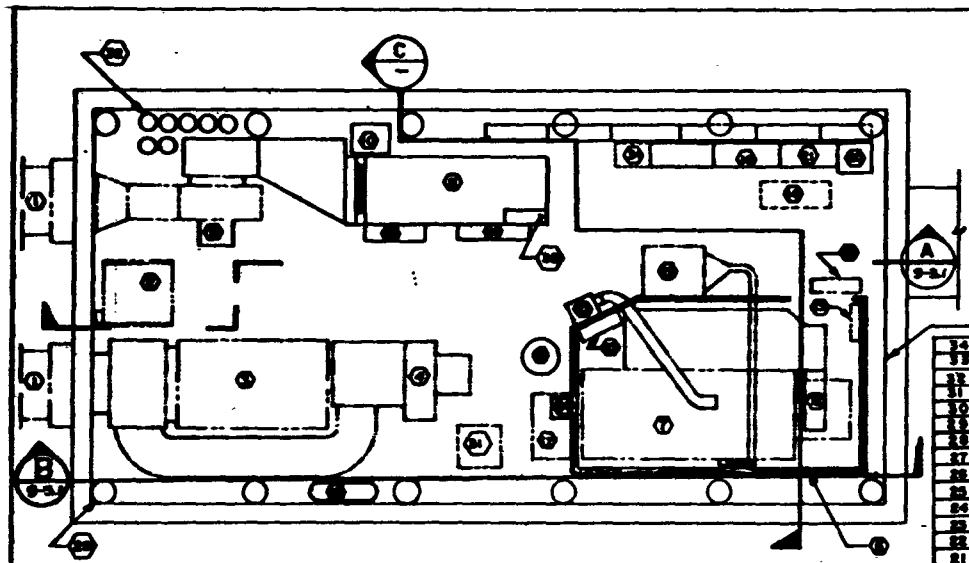


FLOOR PLAN – EQUIPMENT BUILDING

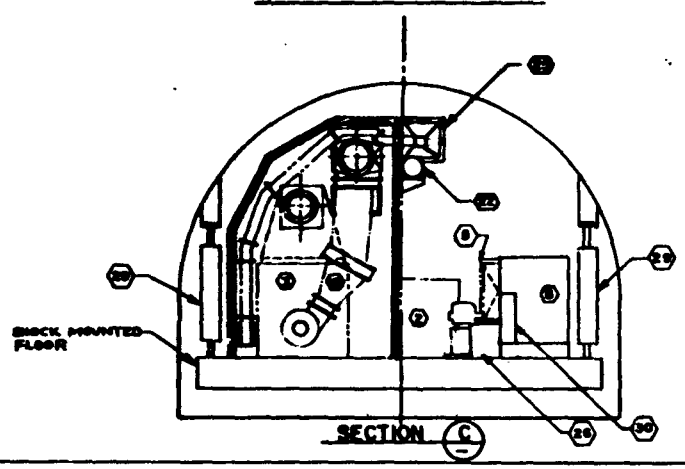


SECTION A

LEAD		REVISED	DATE	FWAFB LAUNCH CONTROL FACILITY LCEB AND TUNNEL JUNCTION SHOCK MOUNTED FLOOR DETAILS	D2-14827 FIG. 9-2
CHECK					
APD					
APD				THE BOEING COMPANY	PAGE 21



PLAN-EQUIPMENT BUILDING



SECTION C

SHOCK MOUNTED FLOOR

EQUIP NO.	EQUIPMENT	FURN CONTRACTOR	INSTL. CONTRACTOR	FURN GOVERNMENT	INSTL. GOVERNMENT
34	SPACE ENVELOPE FOR H&V EQUIPMENT				
33	BATTERY CHARGER	✓	✓		
32	AIR BOTTLES	✓			
31	SIM/TTE RACK			✓	✓
30	ENGINE CRANKING PANEL	✓	✓		
29	SHOCK ISOLATORS	✓	✓		
28	LCEB ALARM PANEL	✓			
27	EXHAUST BLOWER			✓	✓
26	BATTERY	✓	✓		
25	CBR FILTER			✓	✓
24	PANEL INSTALLATION METER AIR FLOW			✓	✓
23	VENT SYSTEM CONTROL PANEL			✓	✓
22	EXPANSION TANK			✓	✓
21	DISTRIBUTION PANEL "LCDH"	✓	✓		
20	ELECTRICAL FILTERS	✓	✓		
19	INSTRUMENT AIR COMPRESSOR			✓	✓
18	CIRCULATING FAN			✓	✓
17	GRIDE AIR COMPRESSOR HARDENED CABLE SCN			✓	✓
16	DISTRIBUTION PANEL "LCDS"	✓	✓		
15	ENGINE SWITCHING & CRANKING PANEL	✓	✓		
14	SHOCK CONTACTOR	✓	✓		
13	H & V CONTROL PANEL			✓	✓
12	FIRE ALARM PANEL	✓	✓		
11	LIGHTING PANEL "LCLA"	✓	✓		
10	LUBE OIL TANK	✓	✓		
9	DIESEL FUEL DAY TANK	✓	✓		
8	DIESEL GENERATOR	✓	✓		
7	AIR CONDITIONING UNIT			✓	✓
6	CLEAN ROOM	✓	✓		
5	AIR EXHAUST BLOWER — VENTILATION			✓	✓
4	AIR INTAKE BLOWER — VENTILATION			✓	✓
3	BRINE CHILLER UNIT			✓	✓
2	BLAST VALVE HYD PANEL (SEE DOCUMENT D2-14907)			✓	✓
1	36" BLAST VALVE (SEE DOCUMENT D2-14907)			✓	✓

CALC			REVISED	DATE
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FWAFB LAUNCH CONTROL FACILITY
LCEB & TUNNEL JUNCTION
STANDARD EQUIP. LAYOUT

D2-14827
FIG. 9-3

THE BOEING COMPANY

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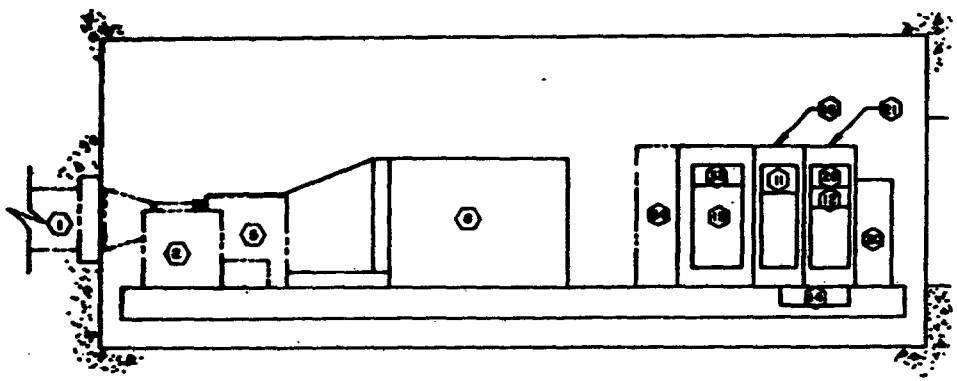
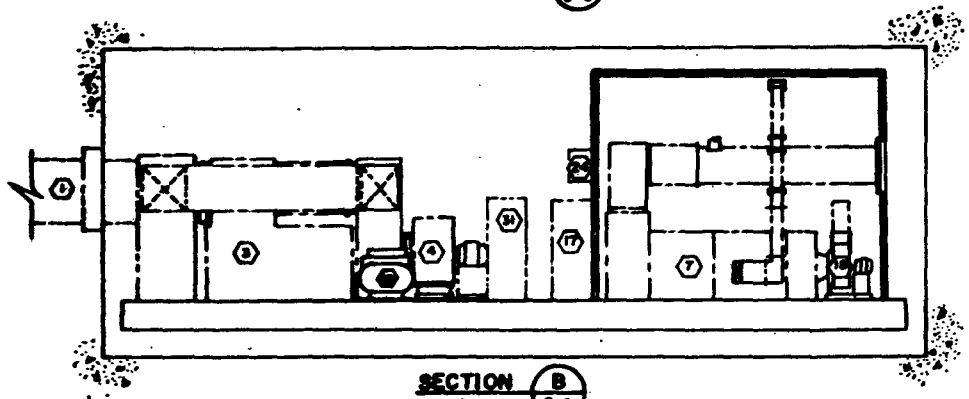


SECTION A
S-3



SECTION B
S-3

CALC		REVISED	DATE	FWAFB LAUNCH CONTROL FACILITY LECB AND TUNNEL JUNCTION STANDAND EQUIP. LAYOUT THE BOEING COMPANY
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APP				

02-14827

FIG 9-3.1

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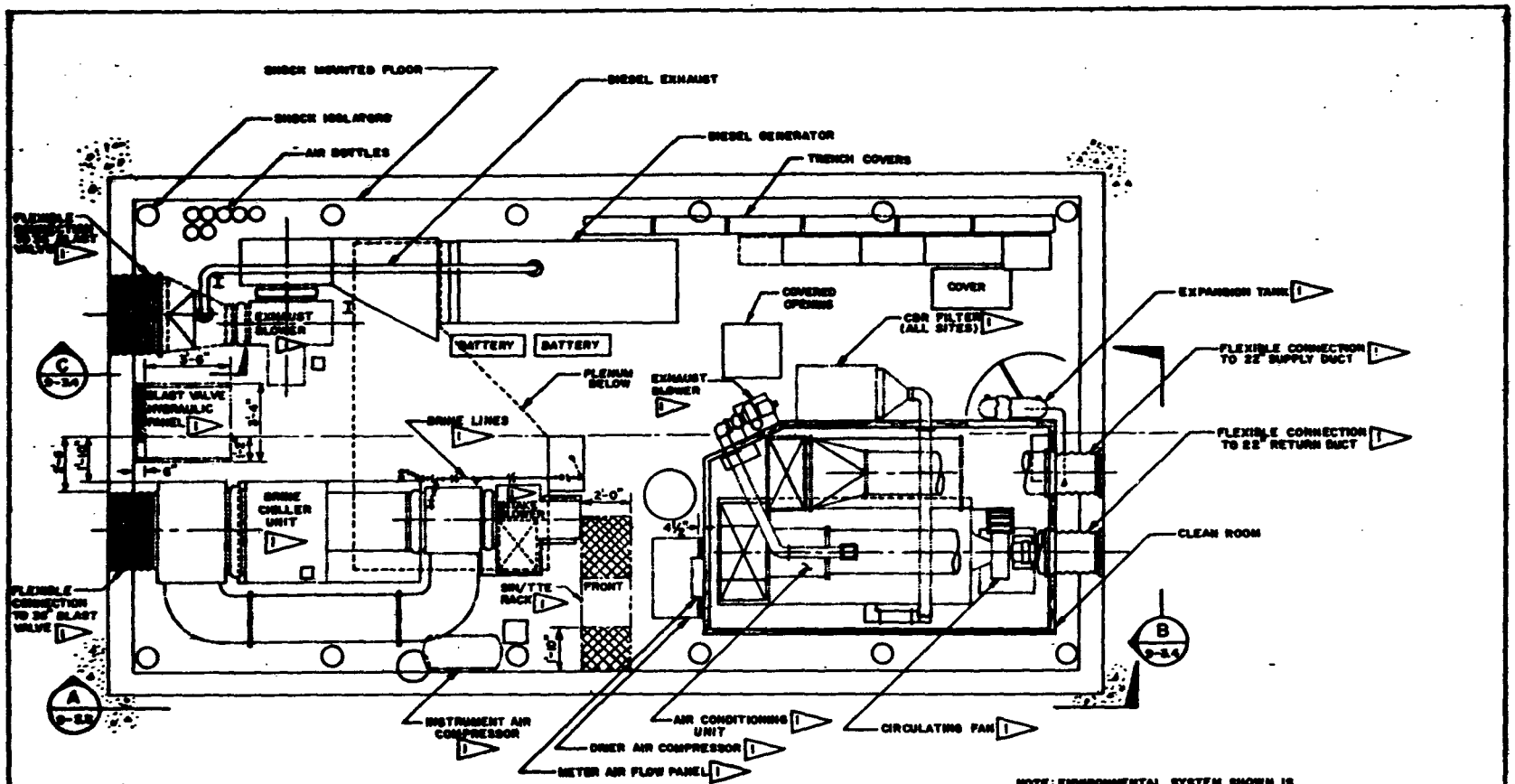
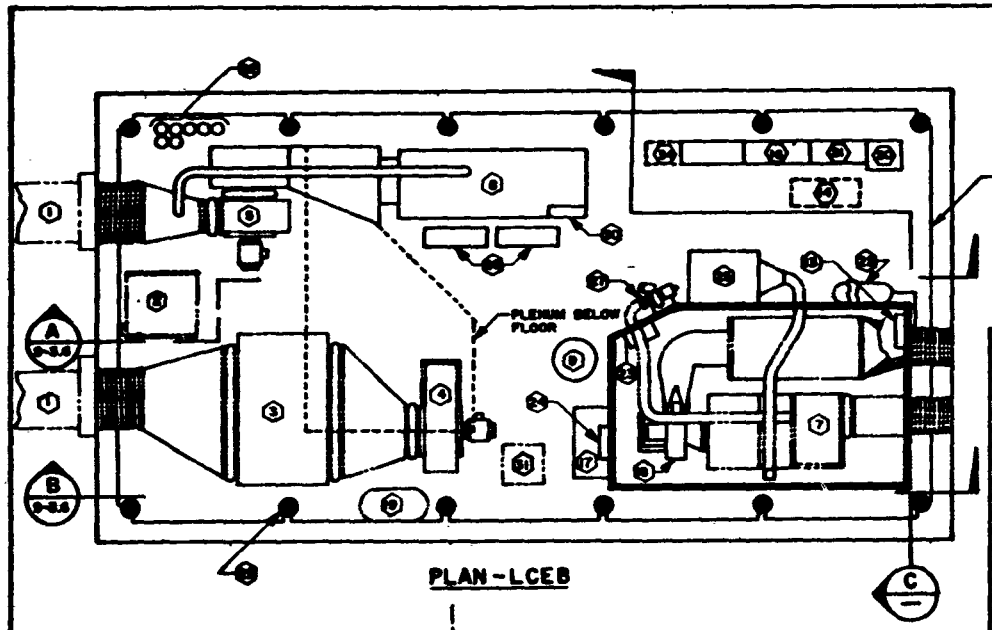


PLAN - EQUIPMENT BUILDING

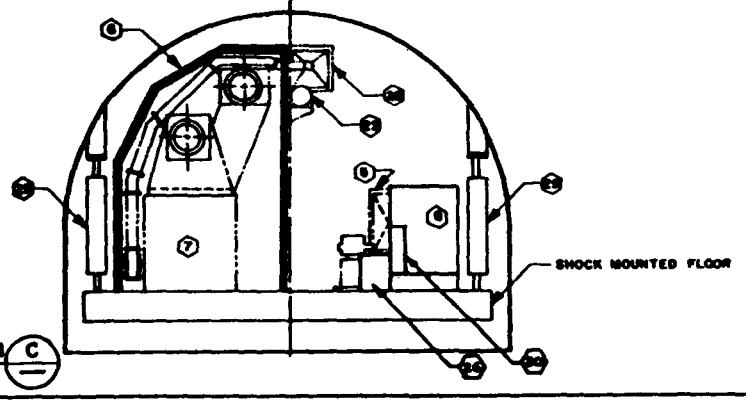
NOTE: ENVIRONMENTAL SYSTEM SHOWN IS FOR STANDARD LCC CONFIGURATION EXCEPT AS NOTED.

1 EQUIPMENT FURNISHED AND INSTALLED BY OTHERS

CHK'D R.L. GRNESS		REVISED	DATE	FWAFB LAUNCH CONTROL FACILITY	D2-14627
CHECK				LCEB AND TUNNEL JUNCTION	
APP				EQUIPMENT SPACE REQUIREMENTS	FIG. 9-3.2
APP				THE BOEING COMPANY	PAGE 24



PLAN - LCEB



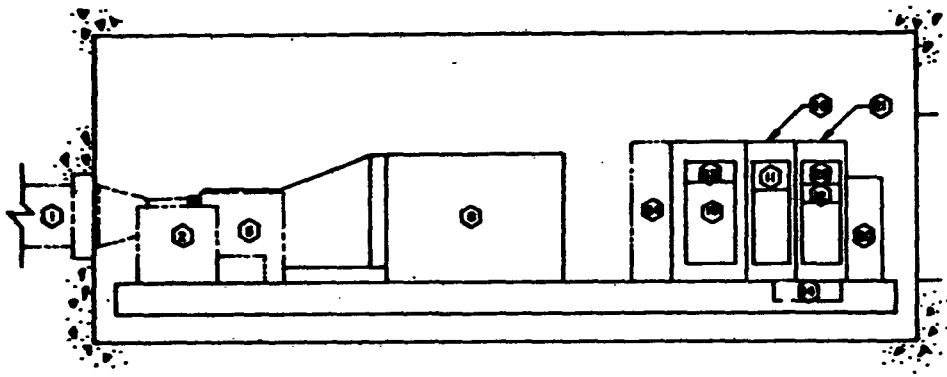
SECTION C

EQUIP NO.	EQUIPMENT	FURN CONTRACTOR	INSTL CONTRACTOR	FURN GOVERNMENT	INSTL GOVERNMENT
34	SPACE ENVELOPE FOR H & V EQUIPMENT				
33	BATTERY CHARGER	X	X		
32	AIR BOTTLES			X	X
31	SIN/TTE RACK				
30	ENGINE CRANKING PANEL	X	X		
29	SHOCK ISOLATORS	X	X		
28	LCEB ALARM PANEL	X	X		
27	EXHAUST BLOWER			X	X
26	BATTERY	X	X		
25	CBR FILTER			X	X
24	PANEL INSTALLATION METER AIR FLOW			X	X
23	VENTILATION SYSTEM CONTROL PANEL			X	X
22	EXPANSION TANK			X	X
21	DISTRIBUTION PANEL "LCDN"	X	X		
20	ELECTRICAL FILTERS			X	X
19	INSTRUMENT AIR COMPRESSOR			X	X
18	CIRCULATING FAN			X	X
17	BACK AIR COMPRESSOR HARDENED CABLE SCN				
16	DISTRIBUTION PANEL "LCDS"	X	X		
15	ENGINE SWITCH & CRANKING PANEL	X	X	X	X
14	SHOCK CONTACTOR	X	X		
13	H&V CONTROL PANEL	X	X	X	X
12	FIRE ALARM PANEL	X	X		
11	LIGHTING PANEL "LCLA"	X	X		
10	LUBE OIL TANK	X	X		
9	DIESEL FUEL DAY TANK	X	X		
8	DIESEL GENERATOR	X	X		
7	AIR CONDITIONING UNIT			X	X
6	CLEAN ROOM	X	X		
5	AIR EXHAUST BLOWER - VENTILATION			X	X
4	AIR INTAKE BLOWER - VENTILATION			X	X
3	ENGINE CHILLER UNIT			X	X
2	BLAST VALVE HYD. PANEL (SEE DOCUMENT D2-14507)			X	X
1	36" BLAST VALVE (SEE DOCUMENT D2-14507			X	X

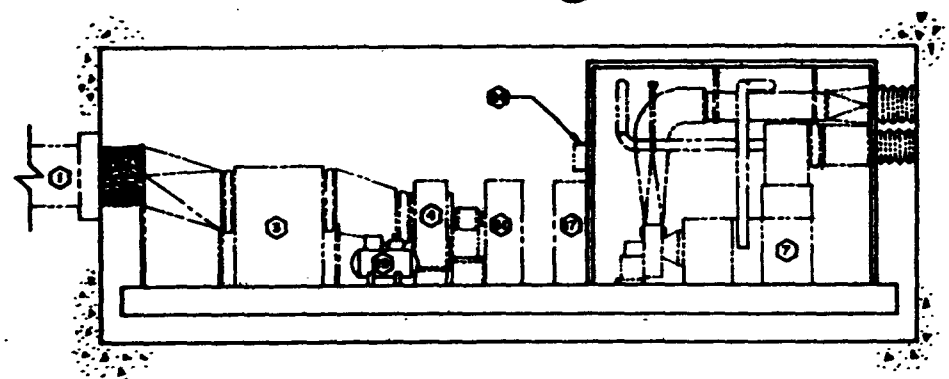
CALC	CHK	APP	A	EARLY L. [illegible]	B/O/LD	REVISED	DATE

PWAFB LAUNCH CONTROL FACILITY
LCEB & TUNNEL JUNCTION
SRCC/ACP EQUIP. LAYOUT
THE BOEING COMPANY

D2-14627
FIG. 9-3.5
PAGE 2.5



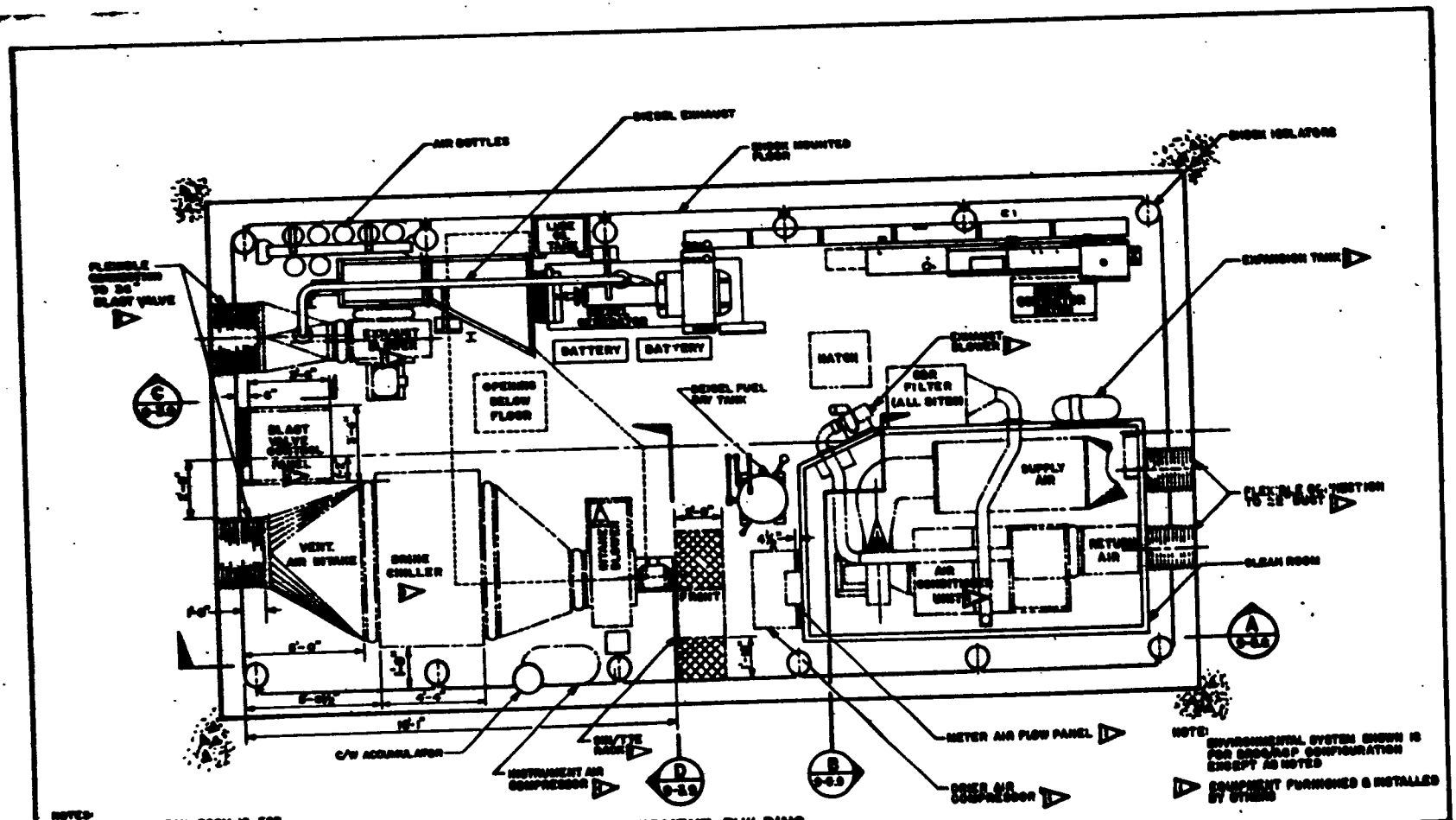
SECTION A (9-3.6)



SECTION B (9-3.6)

CALC	C. EBERLE	2-16-63	REVISED	DATE	FWAFB LAUNCH CONTROL FACILITY
CHECK					LCEB AND TUNNEL JUNCTION
APD					SRCC/ACP EQUIP. LAYOUT
APD					THE BOEING COMPANY

D2-14827
FIG. 9-3.6
PAGE 26



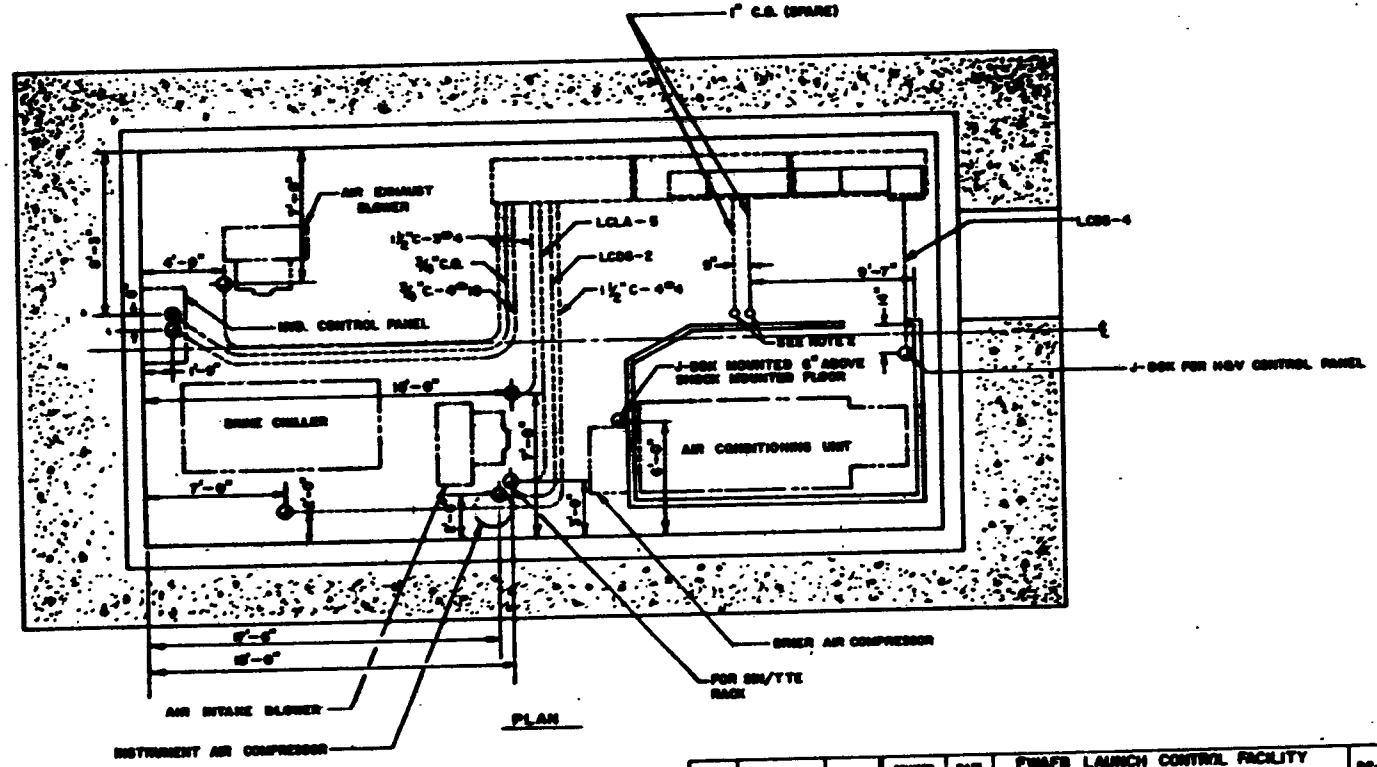
NOTES:
1. AREA WITHIN CLEAN ROOM IS FOR ENVIRONMENTAL CONTROL EQUIPMENT.
2. SIS/TTE RACK REQUIRES ACCESS FRONT AND BACK AS NOTED BY HATCHED AREA.

PLAN EQUIPMENT BUILDING

CALC	CHK & APPD	APPROVED	REVISED	DATE
CHECK				
APP.				
APP.				

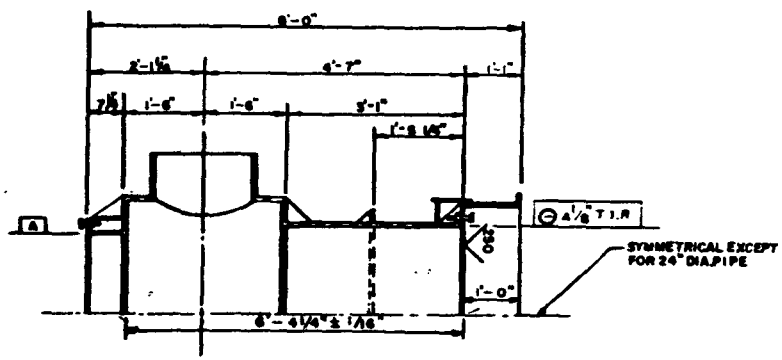
FWAFB LAUNCH CONTROL FACILITY
LCEB AND TUNNEL JUNCTION
EQUIPMENT SPACE REQUIRMENTS
THE BOEING COMPANY

62-14687
FIG. 9-8.7
PAGE 87

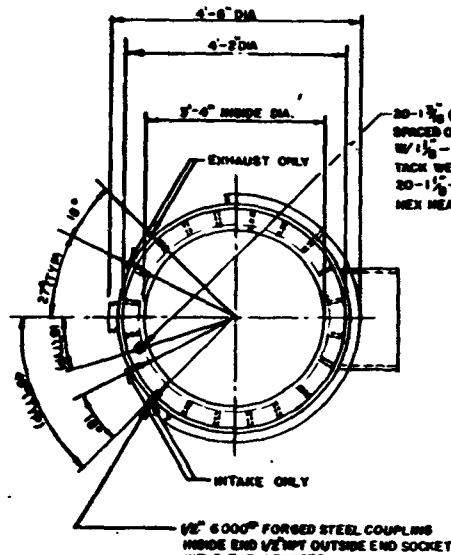


NOTES
1. 6" x 6" x 4" J - BOXES TO BE MOUNTED FLUSH WITH TOP OF FLOOR UNLESS NOTED.
2. WELD COUPLING FLUSH WITH TOP OF FLOOR AND PLUG.

			REVISED	DATE	PWAFB LAUNCH CONTROL FACILITY LCF'S AND TUNNEL JUNCTION EQUIPMENT POWER RECEPTACLE LOCATIONS	DE-14027
CALC						FIG. 9-4
CHECK						
APP					THE BOEING COMPANY	PAGE 28
APP						
DWN	C. POWERS	9-8-62				



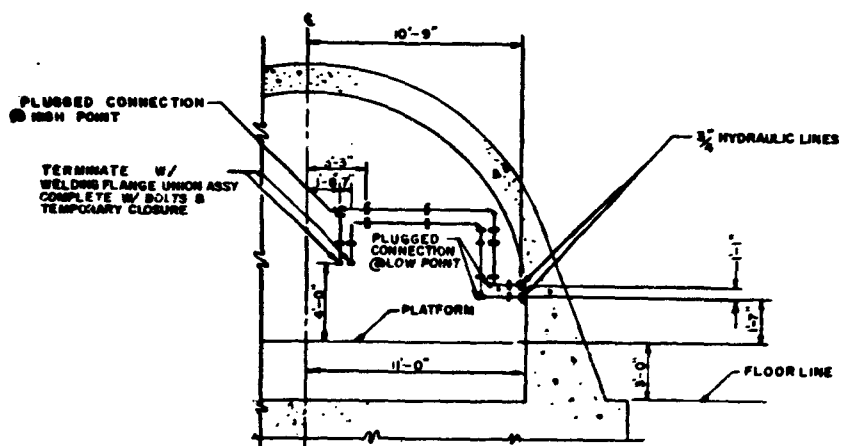
SECTION-BLAST VALVE INSERT



20-1 3/8" ϕ HOLES EQUALLY SPACED ON 3'-6" ± 1/32" BOLT CIRCLE W/ 1 1/8"-7NC-2 HEX NUTS TACK WELDED TO FLANGE 20-1 1/8"-7NC-2X 3 1/2" HEX HEAD BOLTS.

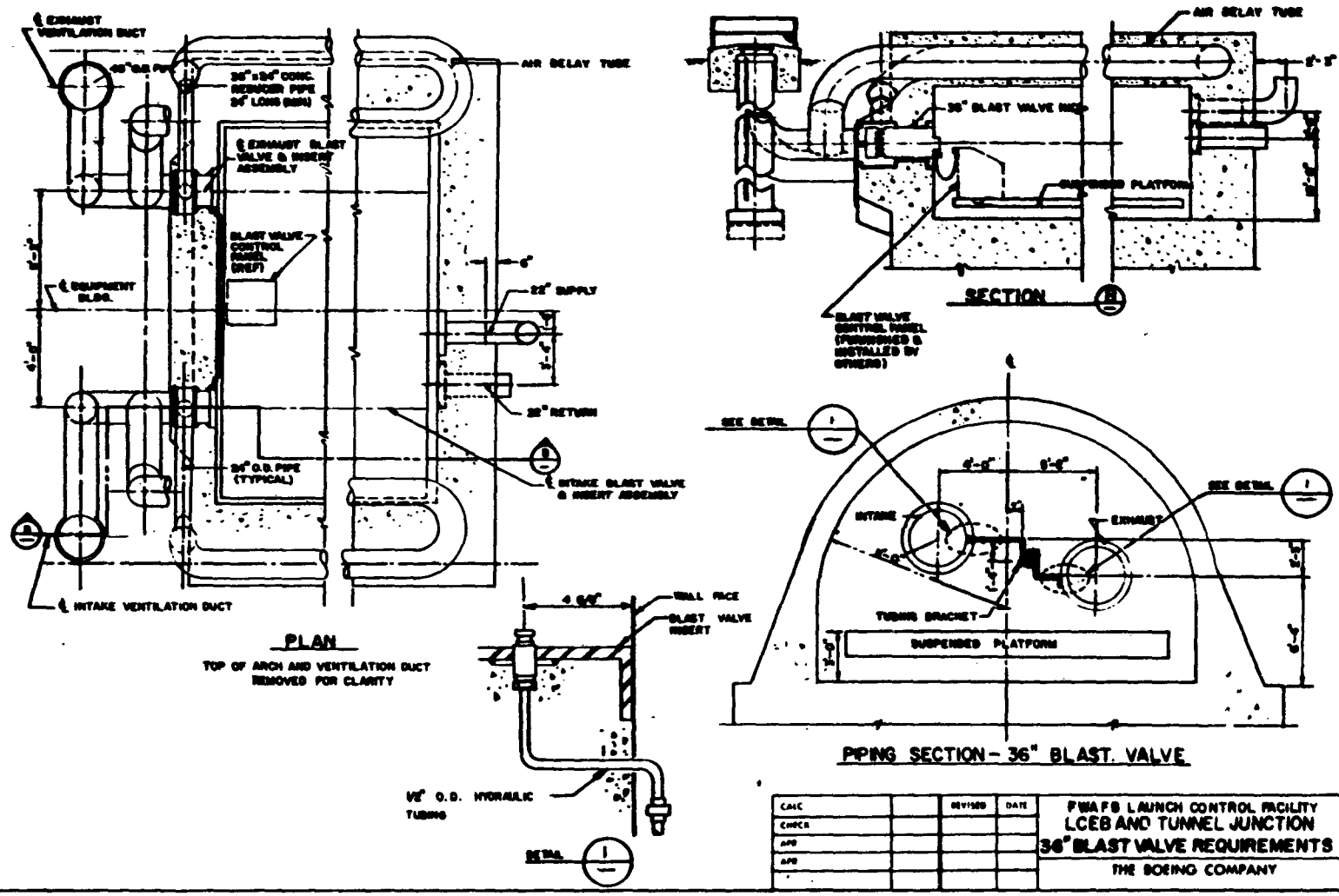
1/2" 6000# FORGED STEEL COUPLING INSIDE END W/ 1/2" NPT OUTSIDE END SOCKET WELD TYP. 4 PLACES

END VIEW- BLAST VALVE INSERT

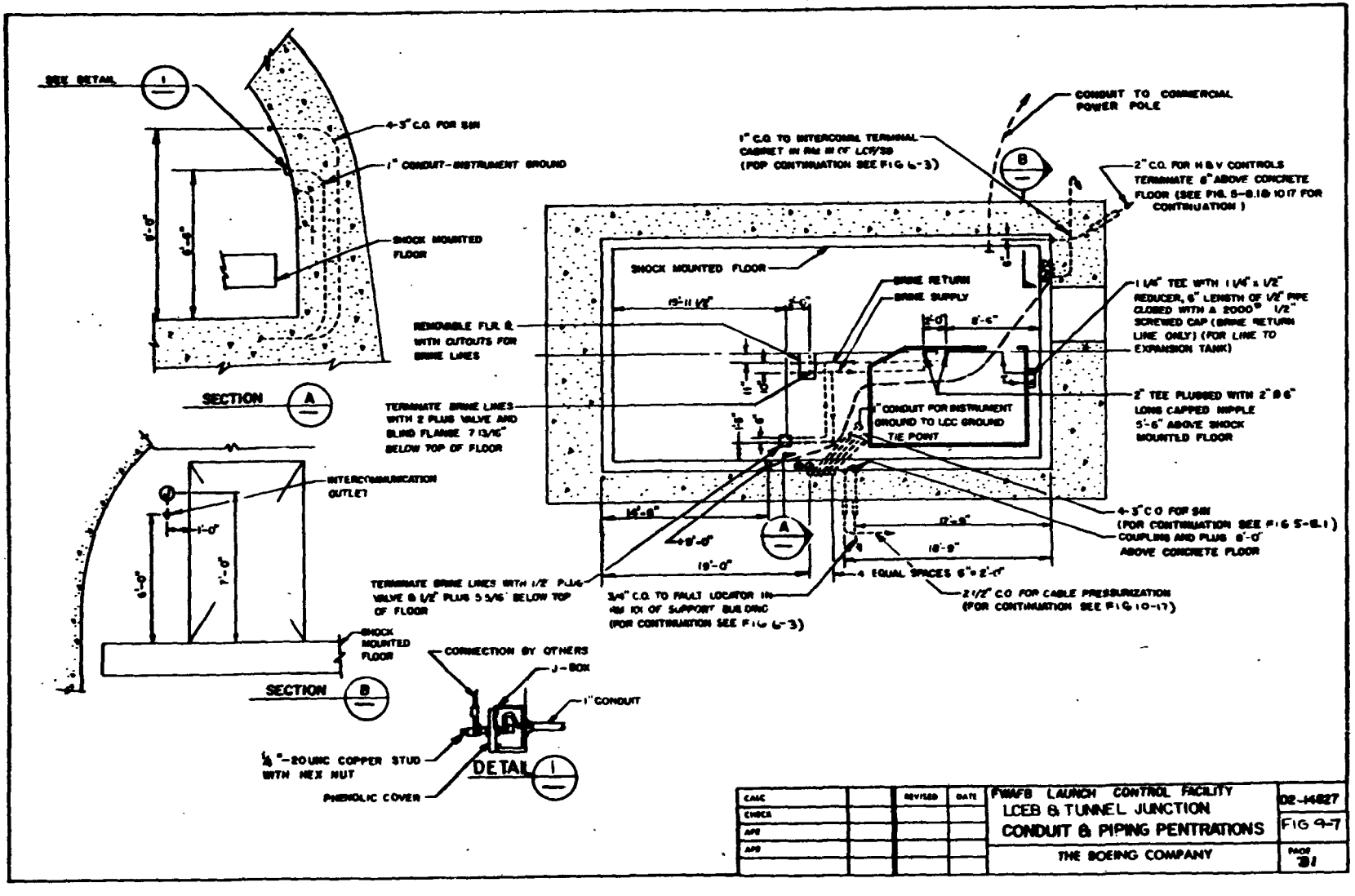


PIPING SECTION — LCEB

CALC		REVISED	DATE	F W A F B LAUNCH CONTROL FACILITY	02-14827
CHECK				LCEB AND TUNNEL JUNCTION	
APP				36" BLAST VALVE REQUIREMENTS	FIG 9-6
APP				THE BOEING COMPANY	PAGE 29



CALC		REVISED	DATE	PWAFB LAUNCH CONTROL FACILITY	02-14827
CHECK				LCEB AND TUNNEL JUNCTION	
APP				36" BLAST VALVE REQUIREMENTS	FIG 9-6.1
APP				THE BOEING COMPANY	PAGE 30



CALC		REVISED	DATE	PWAFB LAUNCH CONTROL FACILITY	02-14827
CHECK				LCEB & TUNNEL JUNCTION	FIG 9-7
APP				CONDUIT & PIPING PENTRATIONS	
APP				THE BOEING COMPANY	PAGE 81

10.0 HARDENED LAUNCH CONTROL CENTER FACILITY CRITERIA

10.2 ARCHITECTURAL

10.2.1 Layout

Delete the words "figure 9-1" and in lieu thereof insert the words "figure 10-1".

10.2.1.1 Type

Delete the paragraph in its entirety and in lieu thereof insert the following:

The shock mounted floor area provided for the personnel and equipment stated shall be identical in size and configuration for three types of LCC's in a wing of twenty (20) LCC's namely:

a. one Alternate Command Post (ACP) per figure 10-2;
b. one Simplex Remote Communication Complex (SRCC) per figure 10-3;
c. eighteen (18) "Standard" LCC's per figure 10-4.

Table 5-1 is a summary of major equipment requirements in the three (3) types of LCC's.

10.6 COMMUNICATIONS

10.6.1 Sensitive Command Network (SCN)

Delete the sentence "b". in its entirety and in lieu thereof insert the following:

b. From LCC to hard UHF Antenna, to hard HF Receive Antenna, and to hard HF Transmit Antenna.

Three (3) 5-inch diameter conduits, hardened, extending from the EM shielded area of LCC to a stub-up point (see figures 11-8, 11-8.1 and 11-8.2)

10.6.3 Intercommunications

Delete the sentence "b." in its entirety and insert the following:

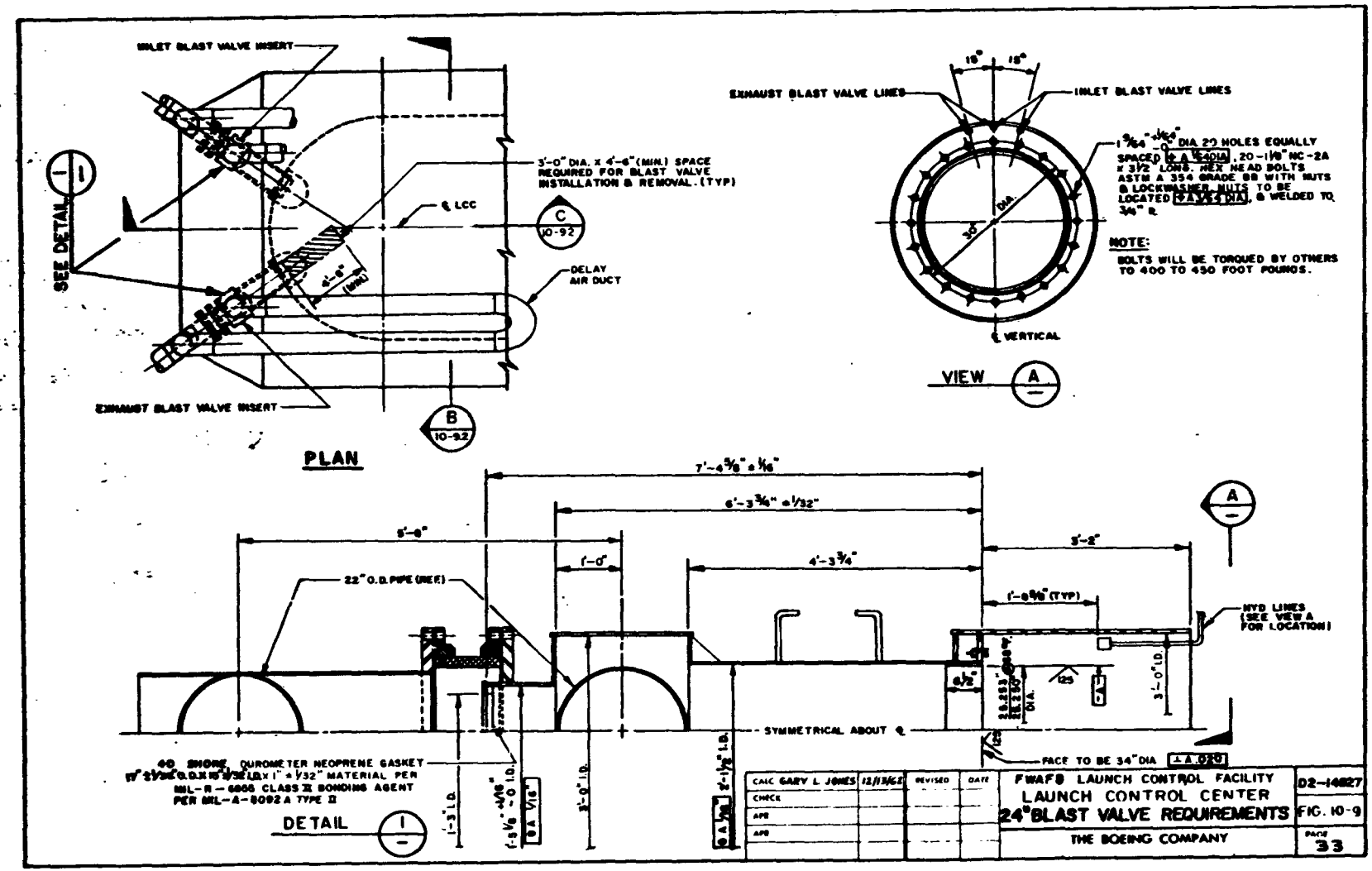
b. Two (2) 2-inch conduits from EM shielded area in LCC to Telephone Room in LCSB to be used as spares.

Also add the following:

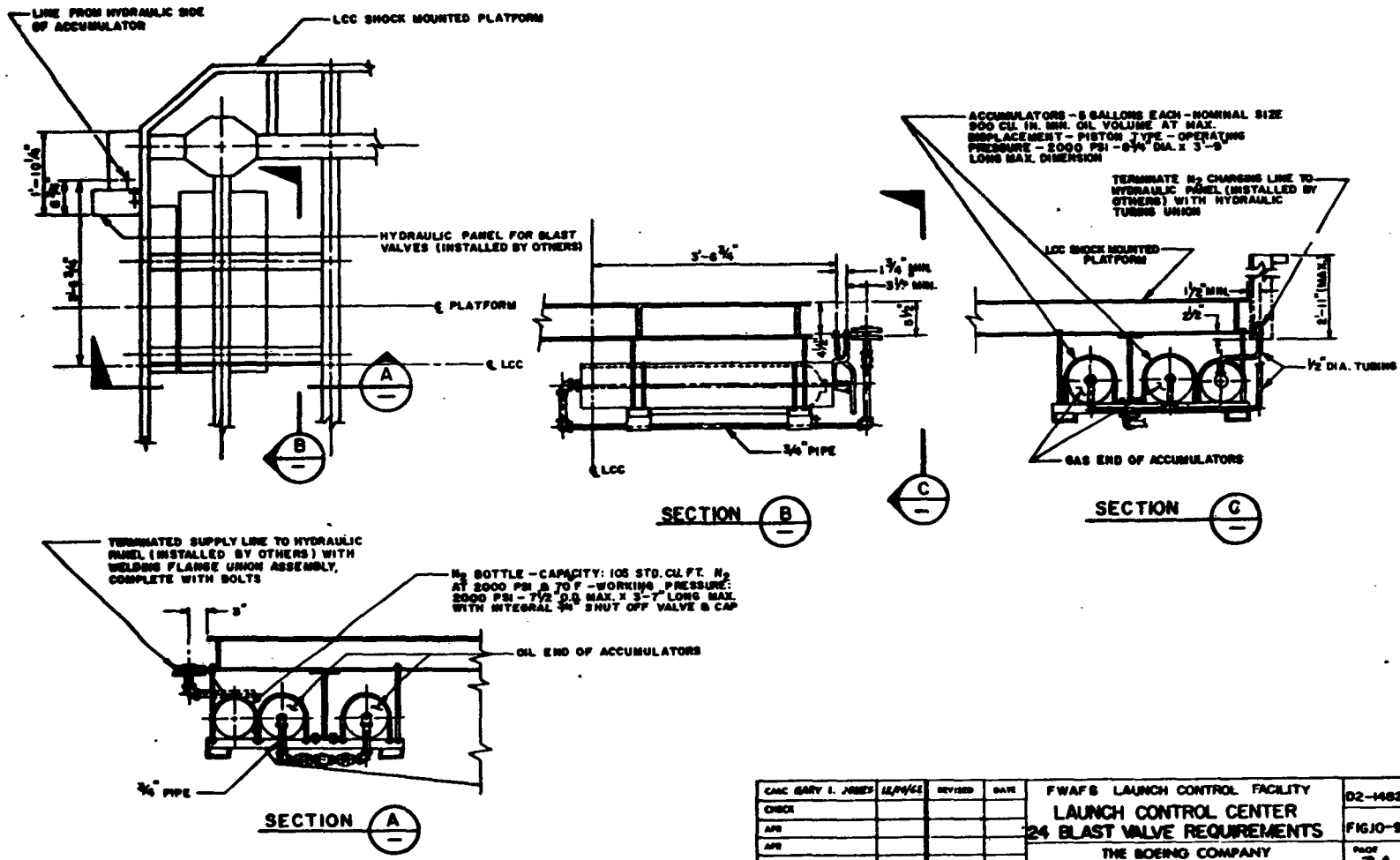
d. One 2-inch conduit from EM shielded area in LCC to soft HF Transmit-Receive Antenna.

DRAWING REVISIONS

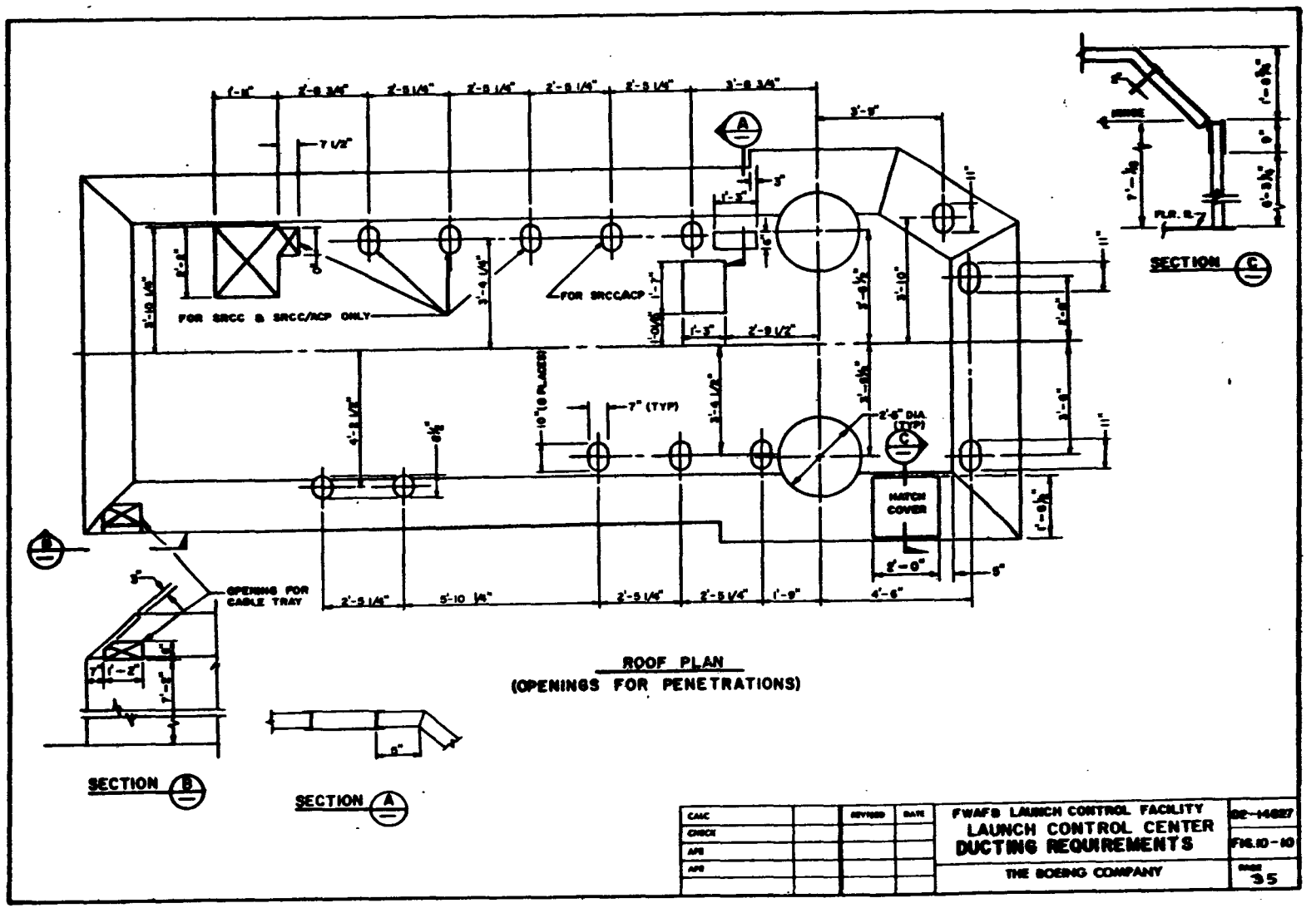
1. Figures 10-9 and 10-9.1 revised per blast valve changes.
2. Figure 10-10 revised to provide cable tray opening.
3. Figure 10-14.1 and 10-17 revised per conduit changes.
4. Figures 10-15 and 10-16.3 revised per cable tray changes.



CALC GARY L. JONES	12/13/62	REVISED	DATE	FWAFB LAUNCH CONTROL FACILITY	D2-14827
CHECK				LAUNCH CONTROL CENTER	FIG. 10-9
APP				24" BLAST VALVE REQUIREMENTS	
APP				THE BOEING COMPANY	PAGE 33

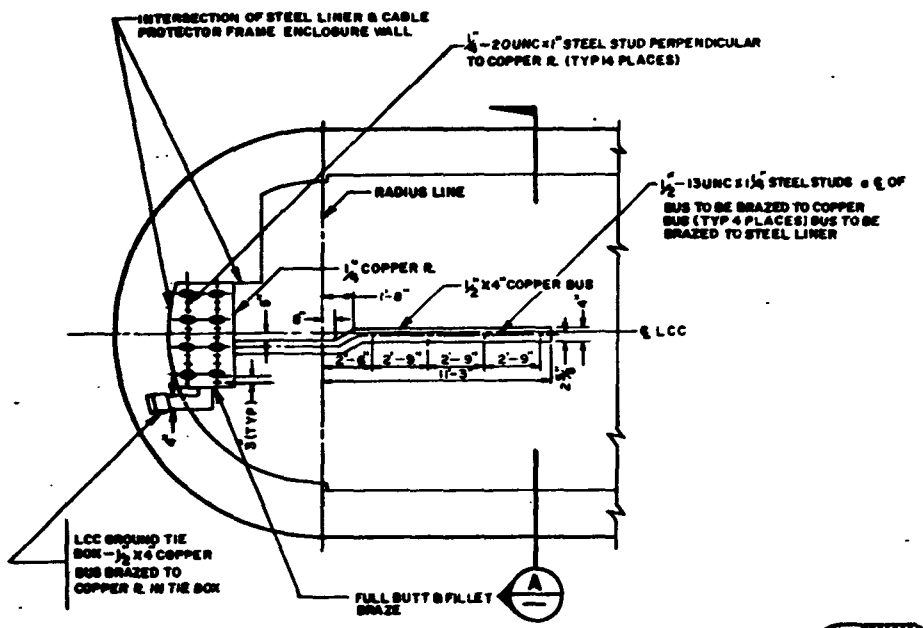


CALC GARY I. JONES	12/04/66	REVISED	DATE	FWAFB LAUNCH CONTROL FACILITY	02-14827
CHECK				LAUNCH CONTROL CENTER	
APP				24 BLAST VALVE REQUIREMENTS	FIGJO-9.1
APP				THE BOEING COMPANY	PAGE 34

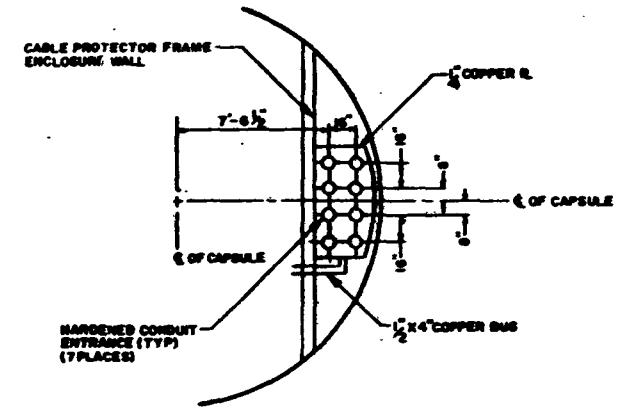


ROOF PLAN
(OPENINGS FOR PENETRATIONS)

CALC		REVISED	DATE	FWAFB LAUNCH CONTROL FACILITY	SE-14827
CHECK				LAUNCH CONTROL CENTER	
APP				DUCTING REQUIREMENTS	FIG.10-10
APP				THE BOEING COMPANY	PAGE 35



PARTIAL ELEVATION



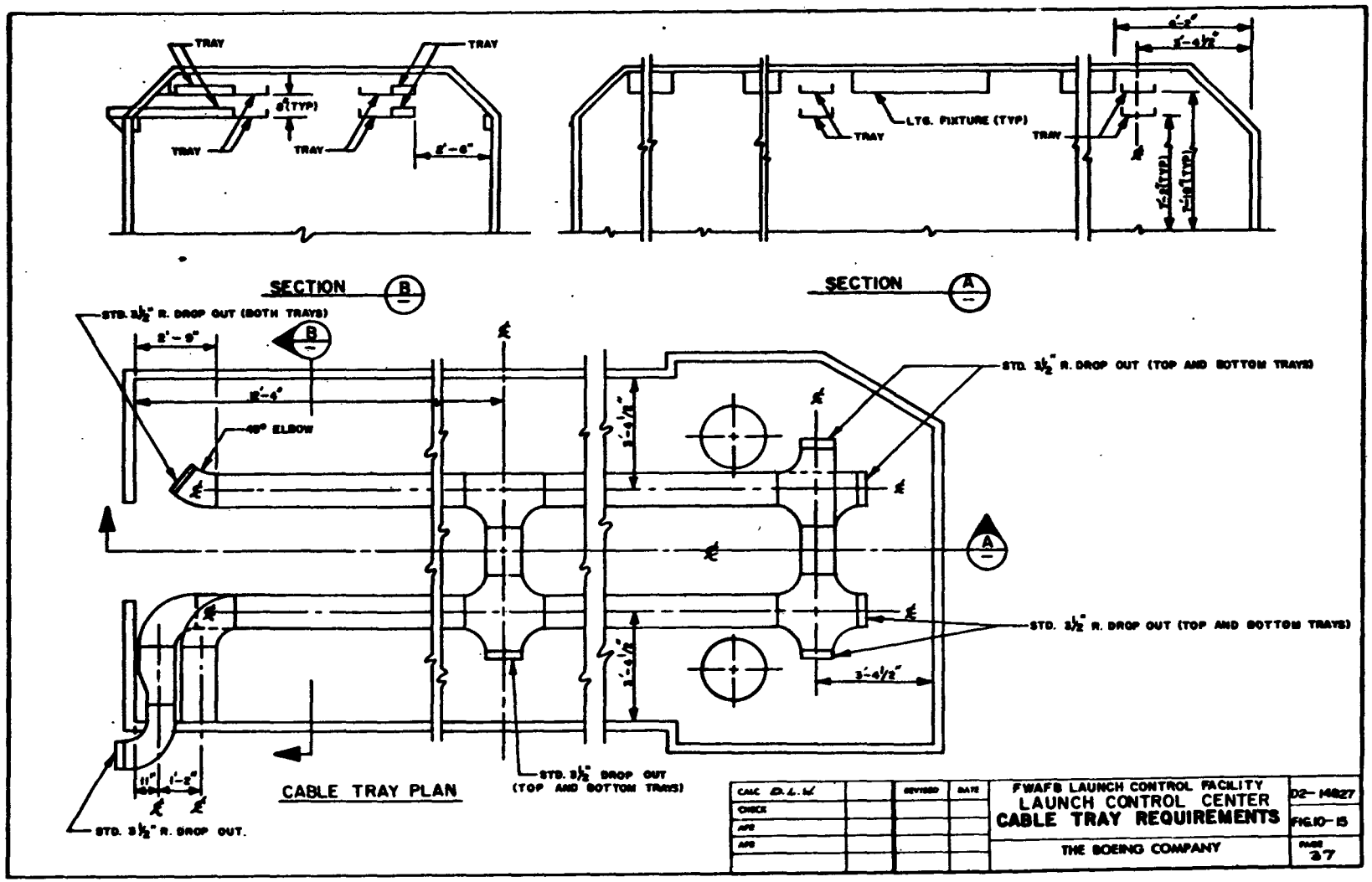
KEY PLAN

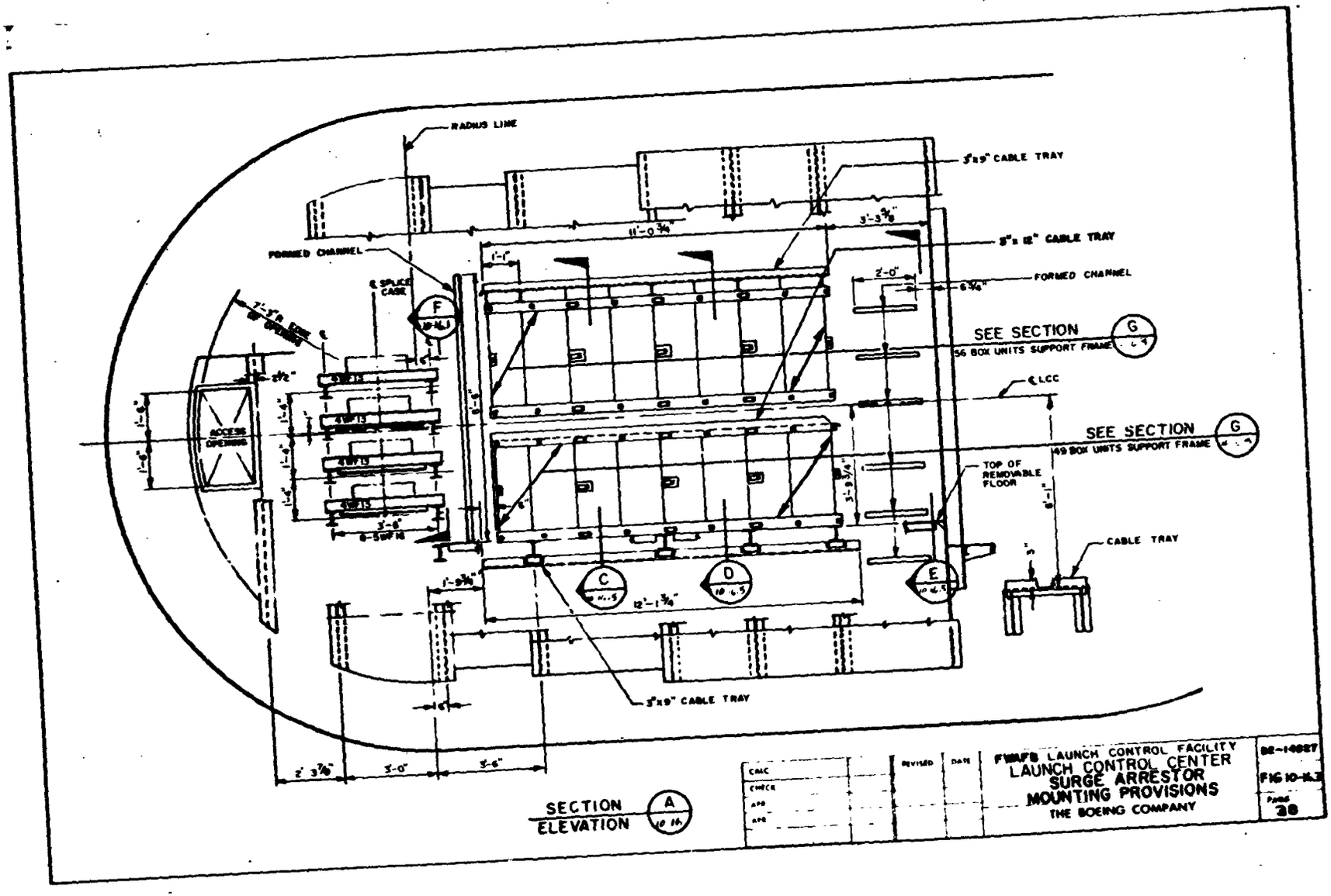
SECTION A

NOTE:

PROVIDE MIN BRAZING OF 25% OF THE PERIPHERY OF THE 4" COPPER BUS, 2" BRAZE EVERY 8" OF PERIPHERY

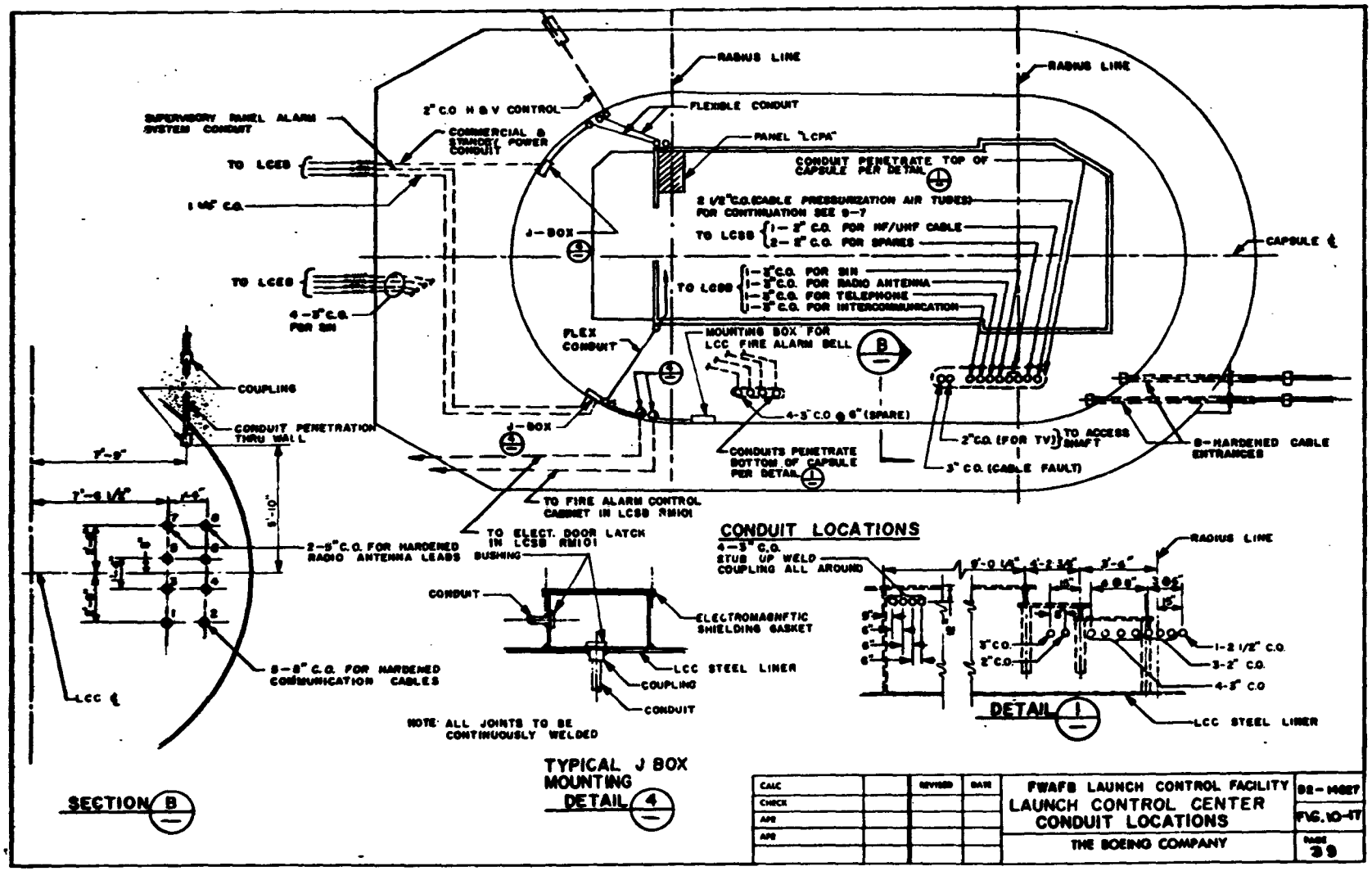
CALC GARY L JONES	12/11/82	REVISED	DATE	FWAFB LAUNCH CONTROL FACILITY	02-14827
CHECK				LAUNCH CONTROL CENTER GROUNDING SYSTEM	FIG. 10-14.1
APP					
APP				THE BOEING COMPANY	PAGE 36


TRAY
TRAY
TRAY
TRAY
6" (TYP)
2'-6"
LTG. FIXTURE (TYP)
TRAY
TRAY
SECTION B
SECTION A
STD. 3½" R. DROP OUT (BOTH TRAYS)
2'-9"
12'-4"
45° ELBOW
STD. 3½" R. DROP OUT (TOP AND BOTTOM TRAYS)
STD. 3½" R. DROP OUT (TOP AND BOTTOM TRAYS)
3'-4½"
STD. 3½" DROP OUT (TOP AND BOTTOM TRAYS)
11"
1'-2"
STD. 3½" R. DROP OUT.
CABLE TRAY PLAN
CALC
CHECK
APP
APP
REVISED
DATE
FWAFB LAUNCH CONTROL FACILITY
LAUNCH CONTROL CENTER
CABLE TRAY REQUIREMENTS
THE BOEING COMPANY
D2-14827
FIG. 10-15
PAGE 37



CALC		REVISED	DATE	FWAFB LAUNCH CONTROL FACILITY LAUNCH CONTROL CENTER SURGE ARRESTOR MOUNTING PROVISIONS THE BOEING COMPANY
CHECK				
APD				
APD				

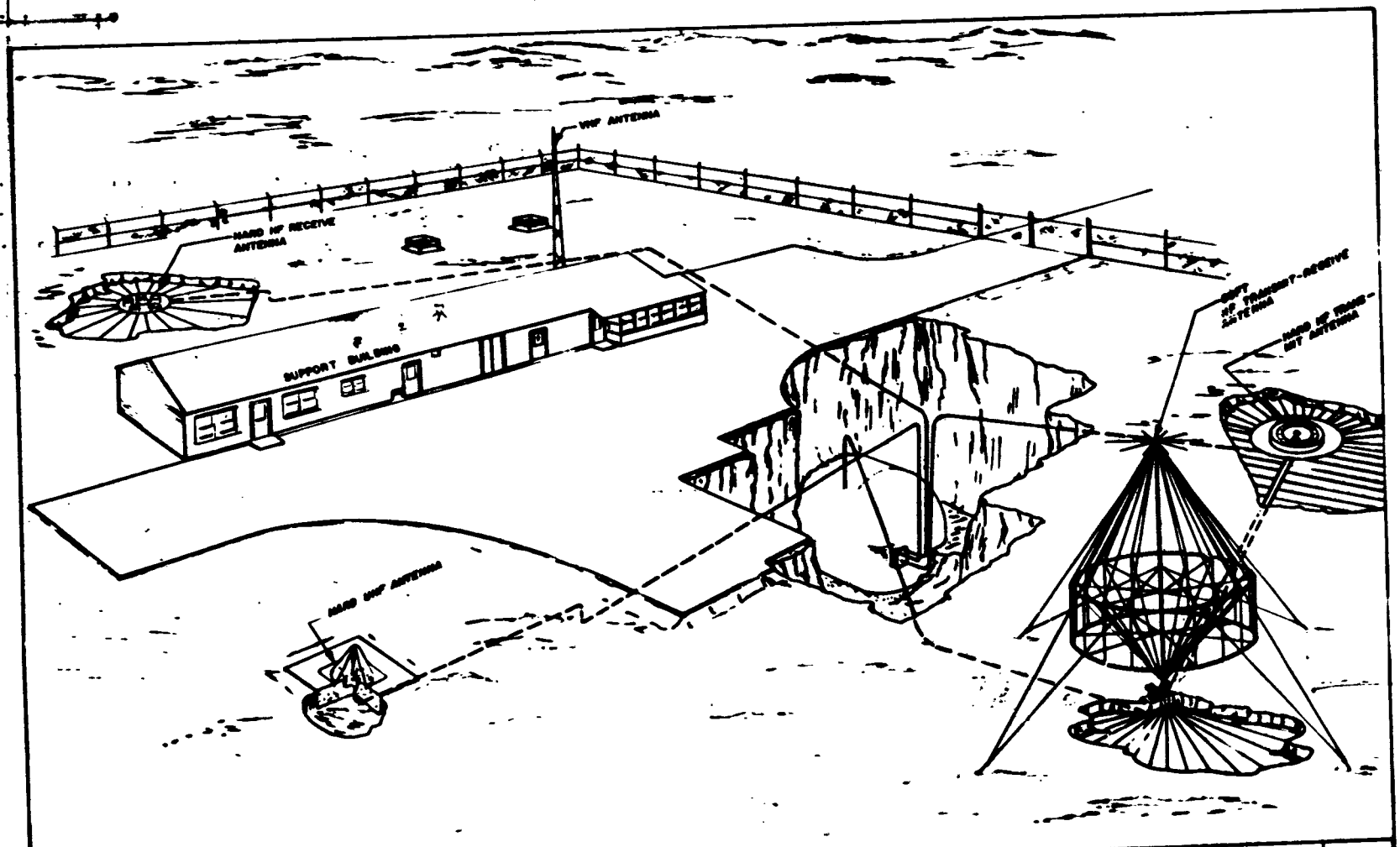
SE-14887
FIG 10-16.3
Page 38


RADIUS LINE
RADIUS LINE
2" C.O H & V CONTROL
FLEXIBLE CONDUIT
SUPERVISORY PANEL ALARM SYSTEM CONDUIT
COMMERCIAL & STANDBY POWER CONDUIT
PANEL "LCPA"
TO LCSB
CONDUIT PENETRATE TOP OF CAPSULE PER DETAIL
2 1/2" C.O. CABLE PRESSURIZATION AIR TUBES) FOR CONTINUATION SEE 9-7
TO LCSB 1-2" C.O. FOR HF/UHF CABLE
2-2" C.O. FOR SPARES
J-BOX
CAPSULE
TO LCSB
4-3" C.O. FOR SIN
TO LCSB 1-3" C.O. FOR SIN
1-3" C.O. FOR RADIO ANTENNA
1-3" C.O. FOR TELEPHONE
1-3" C.O. FOR INTERCOMMUNICATION
FLEX CONDUIT
MOUNTING BOX FOR LCC FIRE ALARM BELL
B
COUPLING
CONDUIT PENETRATION THRU WALL
J-BOX
4-3" C.O @ 6" (SPARE)
2" C.O. (FOR TV) TO ACCESS SHAFT
3" C.O. (CABLE FAULT)
8-HARDENED CABLE ENTRANCES
CONDUITS PENETRATE BOTTOM OF CAPSULE PER DETAIL
TO FIRE ALARM CONTROL CABINET IN LCSB RM101
TO ELECT. DOOR LATCH IN LCSB RM101
2-3" C.O. FOR HARDENED RADIO ANTENNA LEADS
BUSHING
CONDUIT
ELECTROMAGNETIC SHIELDING GASKET
LCC STEEL LINER
COUPLING
CONDUIT
8-3" C.O. FOR HARDENED COMMUNICATION CABLES
LCC ℄
NOTE: ALL JOINTS TO BE CONTINUOUSLY WELDED
CONDUIT LOCATIONS
4-3" C.O. STUB UP WELD COUPLING ALL AROUND
RADIUS LINE
1-2 1/2" C.O.
3-2" C.O.
4-3" C.O
LCC STEEL LINER
DETAIL 1
SECTION B
TYPICAL J BOX MOUNTING DETAIL 4
CALC
CHECK
APP
APP
REVISED
DATE
FWAFB LAUNCH CONTROL FACILITY
LAUNCH CONTROL CENTER
CONDUIT LOCATIONS
THE BOEING COMPANY
88-14067
FIG. 10-17
PAGE 39

12.0 WING IV CRITERIA

DRAWING REVISIONS

1. Figures 11-8, 11-9, and 11-9.1 revised per new siting requirements.
2. Figures 11-8.1, 11-8.2 added per new siting requirements.
3. Figure 11-9.2 deleted per new siting requirements.
4. Figure 11-1 revised per conduit changes.

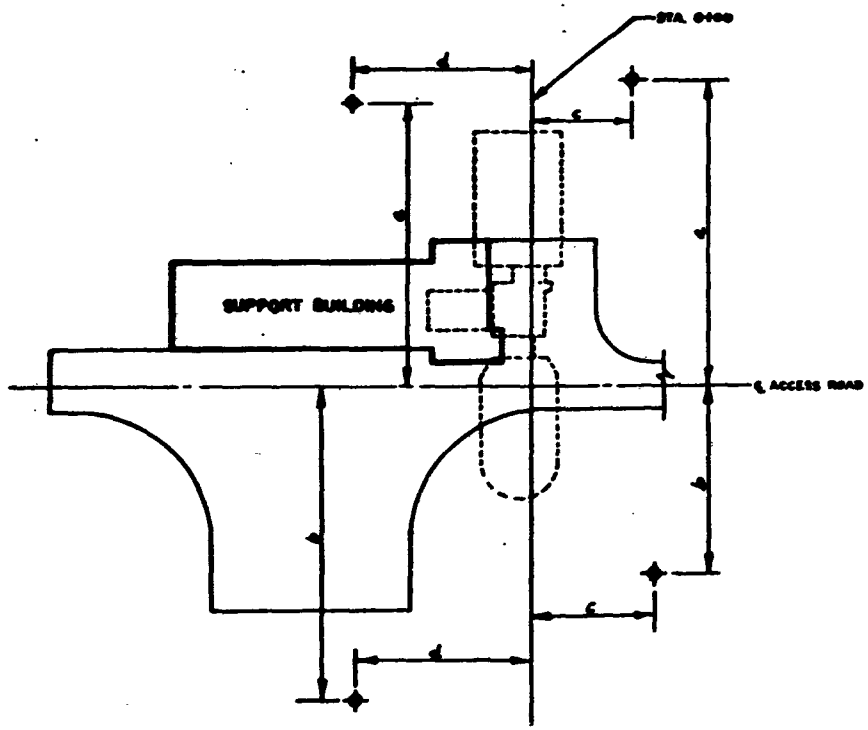


			REVISED	DATE
CALC				
CHECK				
APPR				
APPR				

FWAFB LAUNCH CONTROL FACILITY
HF/UHF ANTENNA FACILITY
TYPICAL ANTENNA FACILITY
THE BOEING COMPANY
SEATTLE 24, WASHINGTON

D2-14827
FIG 11-1
PAGE 41

SITE		A-1	B-1	C-1	D-1	E-1	F-1	G-1	H-1	I-1	J-1	K-1	L-1	M-1	N-1	O-1	P-1	Q-1	R-1	S-1	T-1
HARD HF TRANSMIT SOFT CONTROL STUB-OUTS	a						2000'-0"								137'-6"						
	b	95'-6"	96'-0"	102'-0"	112'-0"	88'-6"			98'-0"	93'-0"	103'-0"		96'-0"	110'-0"		102'-0"	106'-0"	96'-0"	89'-0"	96'-0"	108'-0"
	c		86'-0"		1'-0"		86'-0"		84'-0"					81'-6"	61'-0"			88'-6"		88'-0"	
	d	38'-0"		22'-0"		36'-0"				9'-6"	108'-0"		22'-0"			9'-0"	106'-0"		21'-0"		7'-6"
SOFT HF TRANSMIT-RECEIVE & HF CONTROL STUB-OUTS	a						1928'-0"								137'-6"						
	b	106'-0"	110'-0"	106'-0"	112'-0"	99'-0"			113'-0"	98'-0"	108'-0"		96'-0"	128'-6"		102'-0"	106'-0"	106'-0"	88'-0"	110'-0"	108'-0"
	c		86'-0"		8'-6"				82'-6"					77'-0"	86'-0"			83'-6"		83'-0"	
	d	19'-0"		17'-0"		35'-0"	27'-0"			10'-0"	102'-0"		38'-0"			10'-0"	96'-0"		16'-6"		38'-0"



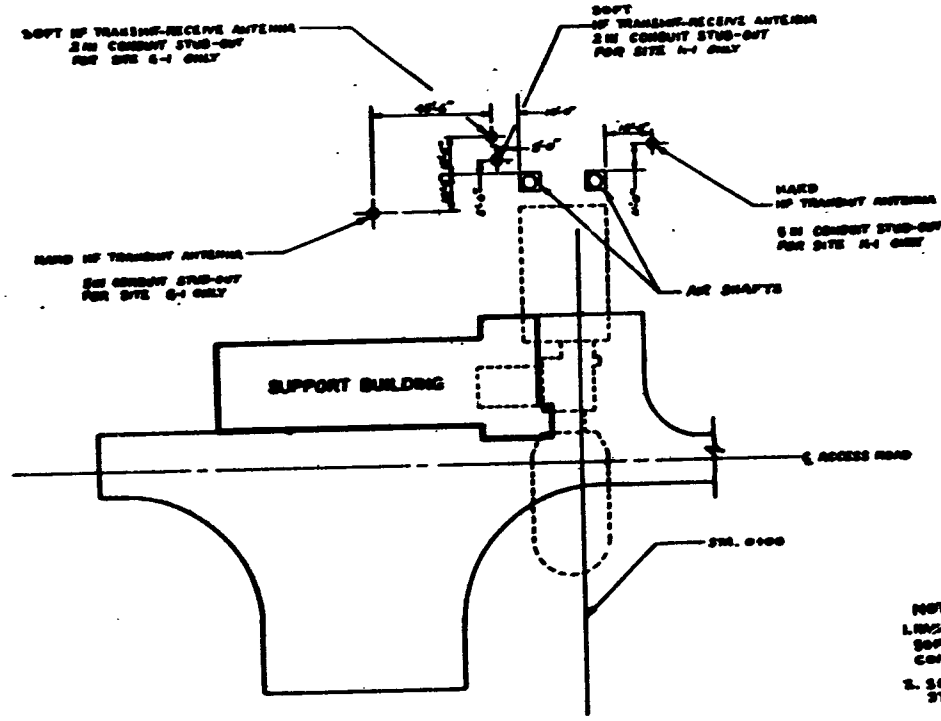
◆ 2"C.O. & 5"C.O. STUB-OUT FOR SOFT HF TRANSMIT-RECEIVE & HARD HF TRANSMIT. SEE TABULATION FOR LOCATING DIMENSIONS OF INDIVIDUAL CONDUIT STUB-OUTS.

NOTES:

1. SEE FIG. 11-8.1 FOR SITES G-1 AND K-1.
2. SEE FIG. 11-8.2 FOR ADDITIONAL STUB-OUTS.

CALC			REVISED	DATE	FWAFB LAUNCH CONTROL FACILITY HF/UHF ANTENNA FACILITY CONDUIT-STUBOUT POINTS THE BOEING COMPANY
CHECK					
APP					
APP					

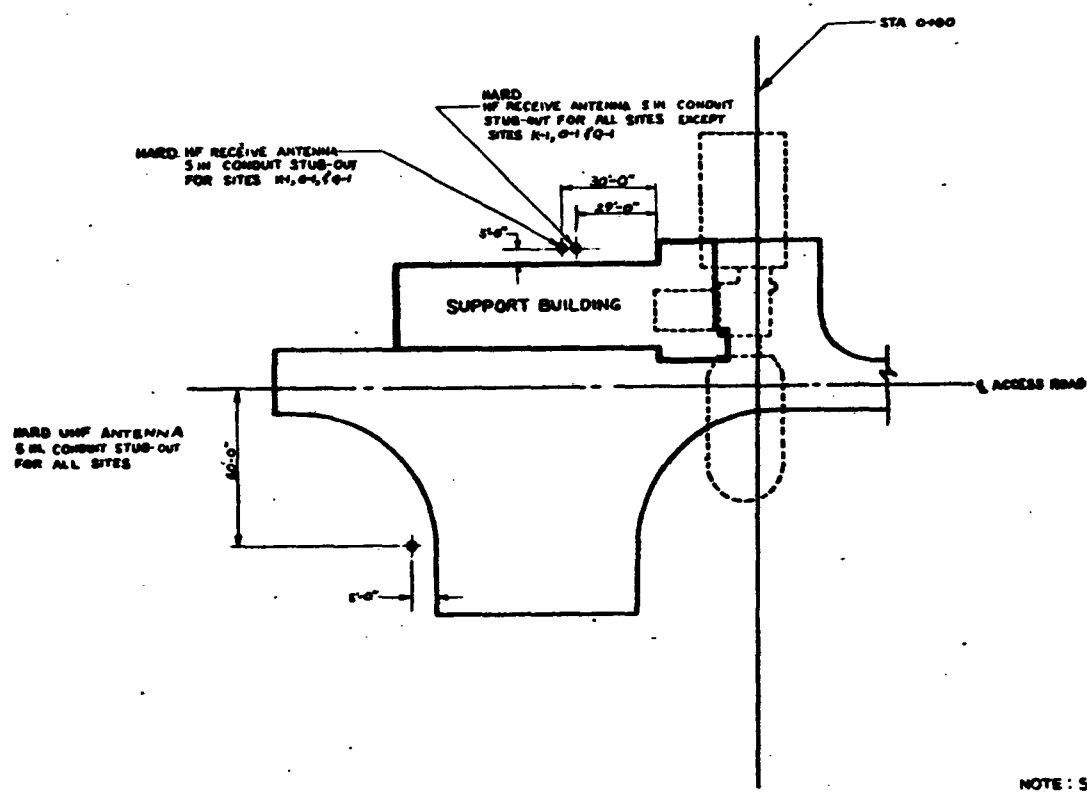
02-14827
FIG. 11-8
PAGE 42



NOTES:

1. 180 HF TRANSMIT ANTENNA 5 IN. CONDUITS AND 90FT HF TRANSMIT-RECEIVE ANTENNA 2 IN. CONDUITS SHOWN FOR SITES G-1 & K-1 ONLY.
2. SEE FIG II-6 & FIG II-6.2 FOR ADDITIONAL STUB-OUTS

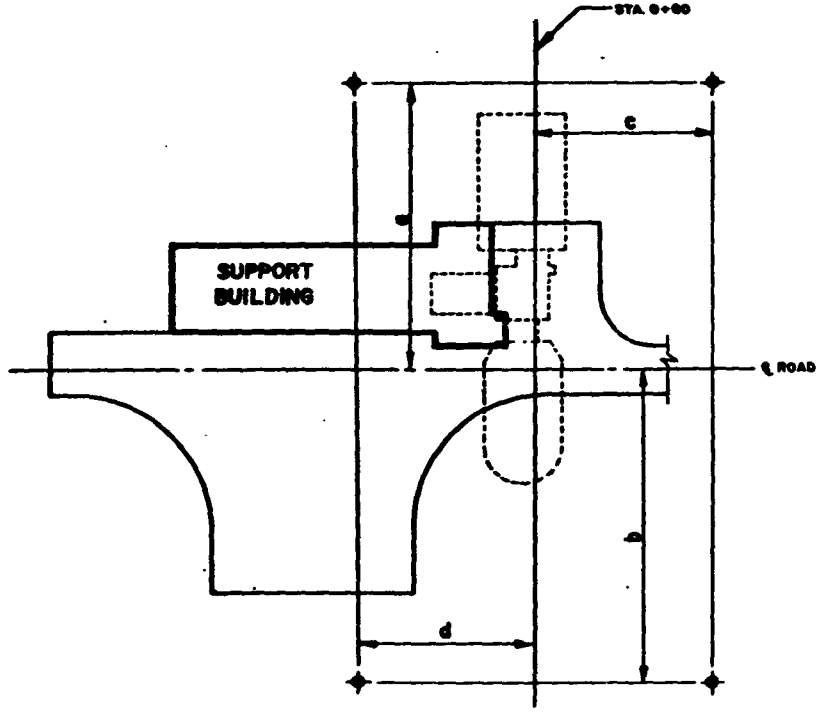
CALC			ISSUED	DATE	PMAFB LAUNCH CONTROL FACILITY HF/UHF ANTENNA FACILITY CONDUIT-STUBOUT POINTS	D2-11827
CHECK						FIG. II-6.1
APD					THE BOEING COMPANY	PAGE 43
APD						



NOTE: SEE FIG. 11-8 & 11-8.1 FOR ADDITIONAL STUB-OUTS.

CALC			REVISED	DATE	FWAFB LAUNCH CONTROL FACILITY HF/UHF ANTENNA FACILITY CONDUIT-STUBOUT POINTS	D2-14827 FIG. 11-8.2
CHECK						
APR						
APR					THE BOEING COMPANY	PAGE 44

SITE		A-1	B-1	C-1	D-1	E-1	F-1	G-1	H-1	I-1	J-1	K-1	L-1	M-1	N-1	O-1	P-1	Q-1	R-1	S-1	T-1
HARD HF TRANSMIT ANTENNA LOCATION	a						307'	245'				222'			210'						
	b	193'	150'	204'	190'	189'			150'	198'	230'		195'	170'		207'	192'	150'	194'	150'	245'
	c		160'		70'				144'	0'				160'	139'			139'		144'	0'
	d	75'		46'		86'	6'	111'			214'	11'	46'			1'	186'		46'		
SOFT HF TRANSMIT-RECEIVE ANTENNA LOCATION	a						241.2'	196'				248.7'			190'						
	b	248'	185'	249.8'	225.7'	235'			185.7'	243.8'	245.7'		235'	215.8'		249.1'	226.7'	185.7'	239.8'	185.7'	290.8'
	c		114.3'		35'				109'					140'	93.2			109'		109'	
	d	31'		26'		64.4'	26'	101'		20'	179'	29'	76'			28'	150'		26'		20'

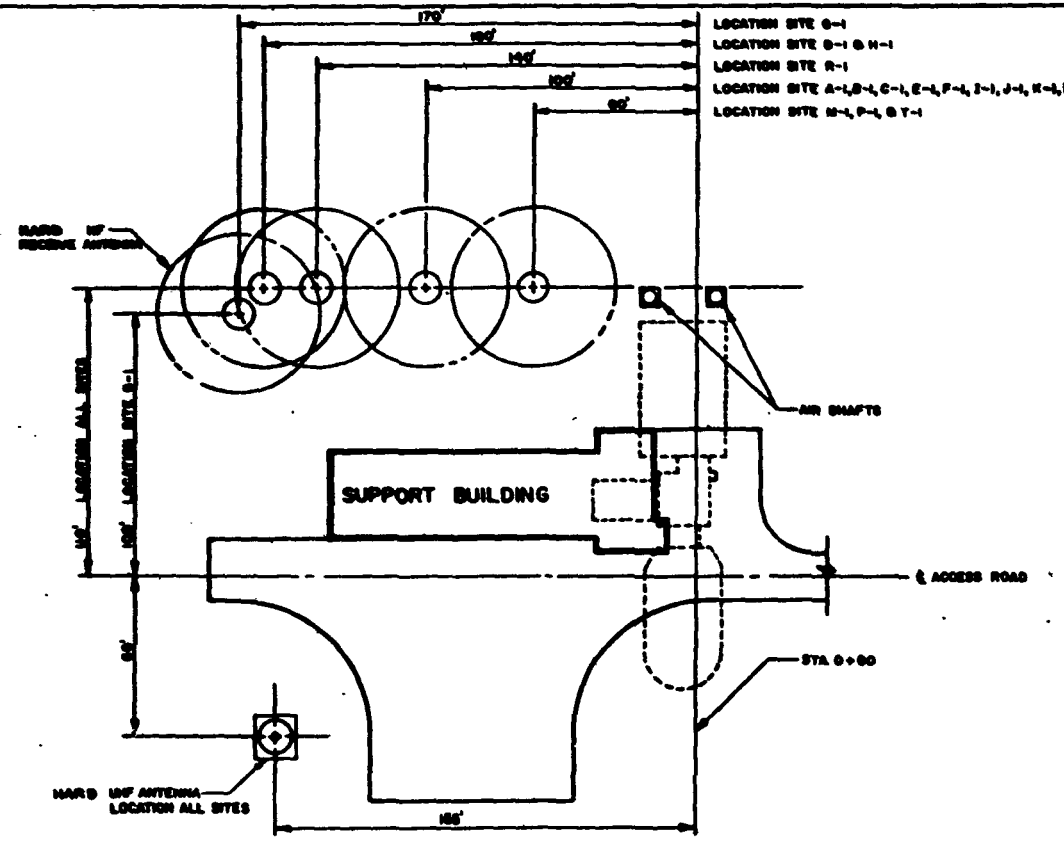


◆ SOFT HF TRANSMIT-RECEIVE & HARD HF TRANSMIT ANTENNA. SEE TABULATION FOR LOCATING DIMENSIONS OF INDIVIDUAL ANTENNA.

NOTES:

1. FOR CONDUIT STUBOUTS SEE FIG. 11-8
2. TOLERANCE ON ANTENNA LOCATING DIMENSIONS IS ± 0.5 FEET
3. FOR ADDITIONAL ANTENNA LOCATIONS SEE FIG. 11-9.1

CALC	R.L.ORNESS		REVISED	DATE	FWAFB LAUNCH CONTROL FACILITY	D2-14827
CHECK					HF/UHF ANTENNA FACILITY	
APP					ANTENNA LOCATIONS	FIG. 11-9
APP					THE BOEING COMPANY	PAGE 45



NOTE:

1. TOLERANCE ON ANTENNA LOCATING DIMENSIONS IS ± .05 FEET
2. FOR ADDITIONAL ANTENNA LOCATIONS SEE FIG. 11-8

CHK			REVISED	DATE
CHECK				
APP				
APP				

FWAFB LAUNCH CONTROL FACILITY
HF/UHF ANTENNA FACILITY
ANTENNA ℄ LOCATIONS

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D2-14827
FIG 11-9.1
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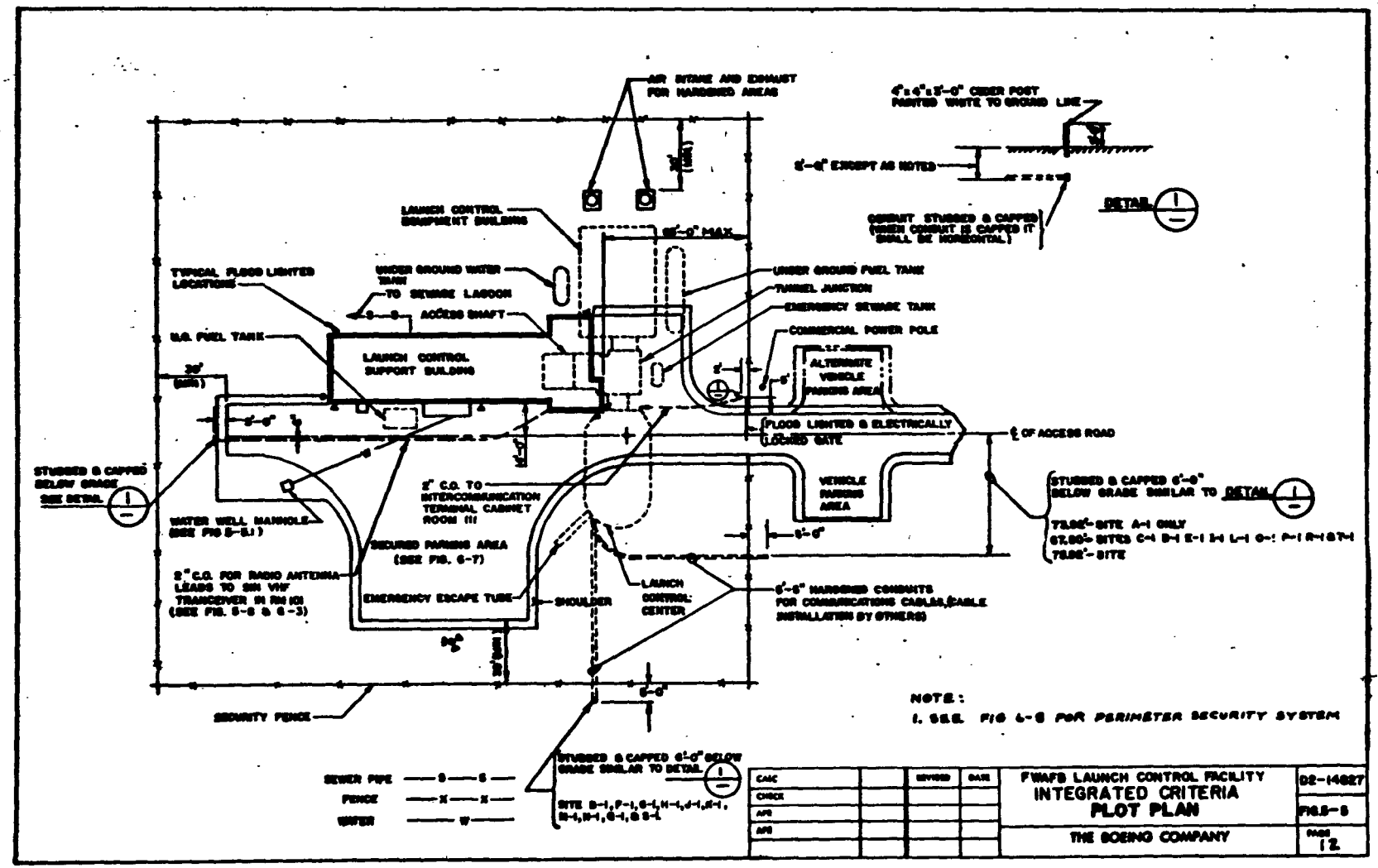
AIR INTAKE AND EXHAUST FOR HARDENED AREAS
4"x4"x5'-0" CEDER POST PAINTED WHITE TO GROUND LINE
5'-0" EXCEPT AS NOTED
CONDUIT STUBBED & CAPPED (WHEN CONDUIT IS CAPPED IT SHALL BE HORIZONTAL)
DETAIL
LAUNCH CONTROL EQUIPMENT BUILDING
60'-0" MAX.
TYPICAL FLOOD LIGHTED LOCATIONS
UNDER GROUND WATER TANK
TO SEWAGE LAGOON
ACCESS SHAFT
U.G. FUEL TANK
LAUNCH CONTROL SUPPORT BUILDING
UNDER GROUND FUEL TANK
TUNNEL JUNCTION
EMERGENCY SEWAGE TANK
COMMERCIAL POWER POLE
ALTERNATE VEHICLE PARKING AREA
FLOOD LIGHTED & ELECTRICALLY LOCKED GATE
℄ OF ACCESS ROAD
STUBBED & CAPPED BELOW GRADE SEE DETAIL
2" C.O. TO INTERCOMMUNICATION TERMINAL CABINET ROOM 111
VEHICLE PARKING AREA
STUBBED & CAPPED 6'-0" BELOW GRADE SIMILAR TO DETAIL
73.06'- SITE A-1 ONLY
67.80'- SITES C-1 D-1 E-1 J-1 L-1 O-1 P-1 R-1 S7-1
75.06'- SITE
WATER WELL MANHOLE (SEE FIG 5-21)
SECURED PARKING AREA (SEE FIG. 6-7)
2" C.O. FOR RADIO ANTENNA LEADS TO SIN V19 TRANCEIVER IN RM 101 (SEE FIG. 5-8 & 6-3)
EMERGENCY ESCAPE TUBE
SHOULDER
LAUNCH CONTROL CENTER
6'-0" HARDENED CONDUITS FOR COMMUNICATIONS CABLES, CABLE INSTALLATION BY OTHERS)
SECURITY FENCE
NOTE:
1. SEE FIG 6-6 FOR PERIMETER SECURITY SYSTEM
SEWER PIPE —S—S—
FENCE —X—X—
WATER —W—
STUBBED & CAPPED 6'-0" BELOW GRADE SIMILAR TO DETAIL
SITE B-1, F-1, G-1, H-1, J-1, K-1, B-1, H-1, G-1, & S-1
CADC
CHECK
APR
APR
REVISED
DATE
FWAFB LAUNCH CONTROL FACILITY
INTEGRATED CRITERIA
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FIG 5-8
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